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Finanční analýza společnosti Hella

Financial Analysis of Hella

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Bibliography
List of Abbreviations
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The declaration

" Herewith I declare that I have elaborated the entire thesis including annexes myself."

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Contents:

1 Introduction

Financial analysis is an analysis for a company for whether a company is stable, solvent, liquid or profitable enough to warrant a monetary investment which based on financial information of the company fiscal report. Because of the scientific standards and systems used and the result of company's financial condition, operating results and financial risks. Managers of the company use it as a very important tool to evaluation of the future of the company. Within the financial analysis result of the company, managers of the company can discover the mistakes they have made in their business and financial management of their company. Investors also can use its result on discover whether the company is able to create value, they can also use the result in making decisions about investing in the company's stocks. For creditors, it analysis the solvency and liquidity of the company and the ability to repay its debts on time.

The purpose of this paper is to analysis the financial situation of Hella by financial analysis from 2015 to 2018. Specifically, we are going to use common size analysis, financial ratio analysis, operating cycle analysis and Dupont analysis to analysis the financial data based on the annual report of Hella from 2015 to 2018.

Here we will separate this paper into 5 chapters. The simple introduction of these 5 chapters is on the below.

For the first chapter, we are going to introduce our purpose and our introduction of the whole structure of this paper.

In chapter 2, we will descript the financial analysis methodology, and provide instruction for our actual operation of the financial analysis after. And we will simply describe the basic financial statements, like the balance sheet, income statement, cash flow statement and statement of changes in owner's equity. And then we are going to introduce the common size analysis and financial ratio analysis. After that, It's time for the Dupont analysis.

Chapter 3 will analysis the basic financial data of financial statements of Hella. We are going to find the change of any financial situations in the balance sheet and income statement, and we will use common size analysis to analysis it in this chapter.

In chapter 4. We are going to analysis the financial ratios and Dupont analysis by the methodologies mentioned in chapter 2. And the data showed in this chapter will be

obtain from the annual report of Hella from year 2015 to year 2018. And we will use the real financial characteristic of Hella, and combined it will the changes to financial ratio of Hella in 2015 to 2017.

In chapter 5. We will make a full conclusion of these 4 chapter mentioned on the upside, and give some advice to investors and managers of Hella.

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2 Description of the Financial Analysis Methodology

The main of this chapter is to introduce the financial analysis methodology we used in order to analysis the financial situation. In this chapter, we will divide the financial methodology into 4 parts. First is the analysis of the financial statement. It will easily show the investors the financial situation. Then we will show the financial analysis methodology of financial ratios and financial situation from a horizontal and vertical common analysis.

It will process data for evaluating any financial rated entities which are determined whether it's suitable or not for the investment.

2.1 Financial statements

Financial statements are accounting statements that reflect the status of funds and profits in an enterprise or budget unit for a certain given period of time. A complete set of financial statements includes a balance sheet, a statement of incomes, a statement of cash flows, a statement of changes in shareholder's equity and notes to the financial statements.

The financial statement is a statement for comprehensive and systematic disclosure of the financial situation, operating results and cash flow of enterprises for a certain period of time, it's conducive for management personnel to understand the completion of the Unit's task indicators, evaluation of the management performance of managers. It's used to identify problems in a timely manner, adjust the direction of a business, formulate measures to improve the level of management, improve economic efficiency, Providing a basis for economic forecasting and decision-making. That's the reason why we will use the financial statement analysis to analysis the corporation.

2.1.1 Balance sheet

The balance sheet is the statement of financial position or statement of financial condition, it shows the fixed, variable and financial assets at a given point of time.

It is used to reflect other important financial statements such as the income statement and statement of cash flows. And it's used for conducting fundamental analysis or for calculating financial ratios.

The formula used mainly on the balance sheet is:

$$Assets = Liabilities + Shareholder's\ Equity. \quad (2.1)$$

The symbol of the balance sheet is shown on Tab. 2.1 .

Tab. 2.1 A symbol of the balance sheet

Balance sheet	
Current assets	**Current liabilities**
Cash and equivalents	Accounts payable
Account receivable	Notes payable
Inventories	Accrued expenses
Other	Total current liabilities
Total current assets	**Long term liabilities**
Fixed assets	Deferred taxes
Property, plant, and equipment	Long-term debt
Less accumulated depreciation	Total long-term liabilities
Net property, plant, and equipment	**Shareholder's equity**
Intangible assets and others	Preferred stock
Total fixed assets	Common stock
	Accumulated retained earnings
	Total equity
Total assets	**Total liabilities + Shareholder's equity**

Source: Stephen Ross, Randolph Westerfield, Jeffrey Jaffe and Bradford Jordan Corporate Finance (2002, p.23)

The asset is a resource formed by an enterprise's past transactions or events that are owned or controlled by the enterprise and is expected to bring economic benefits to the corporation.it can be classified into current assets and fix assets.

Fix assets: The assets used by the company for over the period longer than a year It has a relatively long life and relatively low liquidity.

It contains

- Tangible assets: A tangible asset is an asset that has a physical form, tangible assets included fixed assets, such as machinery, buildings and land, and current assets, such as inventory.
- Intangible assets: An intangible asset is an asset that is not physical in nature. Goodwill, brand recognition and intellectual property, such as patents, trademarks, and copyrights, are all intangible assets.

Current assets are all the assets of a company that are expected to be conveniently sold, consumed, utilized or exhausted through the standard business operations, which can lead to their conversion to a cash value over the next one year period,

Current assets include cash, cash equivalents, accounts receivable, stock inventory, marketable securities, pre-paid liabilities, and other liquid assets. In a few jurisdictions, the term is also known as current accounts.

Liabilities is the obligation you have to pay someone or something else. it's defined as a company's legal financial debts or obligations that arise during the course of business operations.

Liabilities can be classified as current liabilities and non-current liabilities.

just like current assets, current liabilities are settled by the use of a current asset, such as cash, or by creating a new current liability. such as the principal portion of notes payable due within one year, accounts payable and then other current liabilities, such as income taxes payable and interest payable.

Non-current liabilities, also called long-term liabilities, are long-term financial obligations listed on a company's balance sheet that are not due for settlement within one year – as opposed to current liabilities which are short-term debts.

The shareholders' equity, also referred to as stockholders' equity, it a corporation's owners' residual claim after debts have been paid. Equity is equal to a firm's total assets minus its total liabilities. Equity is found on a company's balance sheet, it is one of the most common financial metrics employed by analysts to assess the

financial health of a company. Shareholders' equity can also represent the net or book value of a company.

The formula is contained by total assets and total liabilities :

$$Shareholder's\ equity\ = total\ assets\ - total\ liabilities. \qquad (2.1)$$

2.1.2 Cash flow statement.

The Statement of Cash Flows (also referred to as the cash flow statement) is one of the three key financial statements that reports the cash generated and spent during a specific period of time (i.e., a month, quarter, or year). The statement of cash flows acts as a bridge between the income statement and balance sheet by showing how money moved in and out of the business.

The cash flow statement is a substitute for the original statement of changes in financial position or the statement of the status of cash flows. It describes in detail the cash flow generated by the company's operations, investments, and fundraising activities.

The cash flow statement provides evidence of whether a company is operating healthily. If the cash flow generated by a company's operations does not pay dividends and maintain the production capacity of equity, so that it has to borrow to meet these needs, then this gives a warning that the company cannot sustain its normal expenses in the long run positions.

The balance sheet of an enterprise reflects the assets, liabilities and owners ' equity of an enterprise at a certain point in the hour, including the final status and opening status of the cash resources of the enterprise, but the balance sheet cannot explain the specific reasons for the change of the monetary funds of the enterprise, that is, what are the sources of the cash inflow? The cash flow statement specifies the source of cash inflows and the specific reasons for cash outflows in all types of economic activity of the enterprise, such as how much cash is flowing into the business activities, how much cash is flowing out, how much cash investors invest, how much cash investors withdraw from their investments and pay dividends to investors, how much cash is borrowed from external borrowing, How much cash is returned from borrowing and paying interest, etc.

Here we offer a typical cash flow statement Tab. 2.2 in the sentences below.

Tab. 2.2 A structure of the cash flow statement

Operating activities:
Net income
Depreciation
Changes in assets and liabilities
Total cash flow from Operating activities
Investing activities:
Acquisition of fixed assets
Sales of fixed assets
Total cash flow from Investing activities
Financing activities:
Repurchase of stock
Proceeds from new stock issues
Total cash flow from financing activities

Source: Stephen Ross, Randolph Westerfield, Jeffrey Jaffe and Bradford Jordan Corporate finance (2002, p.29)

2.1.3 Income statement.

The Income Statement is one of a company's core financial statements that shows their profit and loss over a period of time. The profit or loss is determined by taking all revenues and subtracting all expenses from both operating and non-operating activities.

The income statement is one of three statements used in both corporate finance (including financial modeling) and accounting. The statement displays the company's revenue, costs, gross profit, selling and administrative expenses, other expenses and income, taxes paid, and net profit, in a coherent and logical manner.

The income statement can be used to analyze the profitability of the corporation and predict the future cash flow of the corporation. The income statement reveals

detailed information on operating profits, net investment gains and net investment gain or loss from outside business, which can be used to analyze the profitability of an enterprise.

And we offered a structure of income statement Tab. 2.3.

Tab. 2.3 A structure of the income statement:

Income statement
Total operating revenues
Cost of goods sold
Selling, general and administrative expenses
Depreciation
Operating income
Other income
Earnings before interest and taxes
Interest expense
Pretax income
Taxes:
Current
Deferred
Net income
Retained earnings
Dividends

Source: Stephen Ross, Randolph Westerfield, Jeffrey Jaffe and Bradford Jordan: Corporate Finance (2002, p.25)

2.1.4 Statement of changes in owner's equity

A statement of changes in owner's equity used to report changes in the owner's investment in the business over time and assists the analysis in understanding the changes in financial position reflected on the balance sheet.

The change of owner's equity statement explains how the shareholder's equity changes due to the profit and loss of the enterprise's operation and the payment of cash dividend at a certain time. It is the most important information to explain whether management treats shareholders fairly.

Through the statement of change in owner's equity, it can not only provide the report user with the information of the increase or decrease of the total owner's equity, but also provide it with the structural information of the change of the owner's equity, especially to enable the report user to understand the original cause of the change of the owner's equity.

2.2 Common-size analysis

The common-size analysis is the financial statement analysis method which converts each financial statement data to an easily comparable, common-size, amount measured as a percent. This is done by stating income statement items as a percent of net sales and balance sheet items as a percent of total assets (or total liabilities and shareholders' equity).

The common-size analysis reflects the proportional relationship between the relevant items in the same statement and shows the relative importance of each purpose. it’s used to facilitate the analysis and comparison of the appropriateness of the changes in the items in the same statement.

In the common-size analysis, we always separate into two analysis method:

Horizontal common-size analysis and Vertical common-size analysis.

2.2.1 Horizontal common-size analysis

Horizontal common-size analysis refers to the comparison of an enterprise with other enterprises at the same point in time (or period). The horizontal common-size analysis is required in the areas of target corporate valuation, management performance assessment and compensation plans, financial crisis forecasting, and public policy formulation of excess profits tax in corporate mergers and acquisitions.

In horizontal common-size analysis. We are using such formula to calculate the changes of percentage

$$absolute\ change = U_t - U_{t-1}\ , \tag{2.3}$$

$$percentage\ change = \frac{U_t - U_{t-1}}{U_{t-1}}.100\%\ . \tag{2.4}$$

Where U_t is the amount of analysis period, $U_{t-1}$is amount of previous period (which could be last year, season or month).

2.2.2 Vertical common-size analysis

Vertical common-size analysis usually refers to the calculation of the ratio between the whole and the part only for the financial report related data during the same investigation period and analyzes the composition of a report project and the overall proportion of each project.

Not only to help to identify trends in order to predict the future, but the longitudinal analysis is also useful in terms of management performance evaluation, among other things (to observe how much of the change in profits is due to factors other than companies).

In the vertical common-size analysis, we are using such a formula to calculate and measure the changes, and we are going to use *%N* as the proportion of the project:

$$\%N = \frac{N_i}{\sum_n N_i}.100\%\ , \tag{2.5}$$

where N_i is the item. $\sum_n N_i$ is sum up of the items.

2.3 Operating cycle analysis.

The length of the operating cycle is an important factor in determining the company's current assets requirements. A shorter operating cycle indicates the effective management of accounts receivable and inventory. That's why it's important for analysis of an operating cycle of a company.

Operating cycle is the number of days a company takes in realizing its inventories in cash. It equals the time taken in selling inventories plus the time taken in recovering cash from trade receivables. It is called operating cycle because of this process of producing/purchasing inventories, selling them, recovering cash from customers, using that cash to purchase/produce inventories and so on is repeated as long as the company is in operations.

Operating cycle is a measure of the operating efficiency and working capital management of a company. A short operating cycle is good as it tells that the company's cash is tied up for a shorter period.

The operating cycle can be defined in three activities:

1. purchasing resources for production.
2. Production of the product
3. Distribution of selling the final product.

The Operating cycle is defined by such formula :

$$Operating\ cycle\ = ICP\ + RCP, \tag{2.6}$$

where Inventory conversion period (ICP) is the length of time required to produce and sell products and Receivables conversion period (RCP) is the length of time to receive payments for sold products.

The cash conversion cycle (CCC) is a metric that expresses the time (measured in days) it takes for a company to convert its investments in inventory and other resources into cash flows from sales. Also called the Net Operating Cycle or simply Cash Cycle, cash conversion cycle attempts to measure how long each net input dollar is tied up in the production and sales process before it gets converted into cash received.

The Formula is calculating the net aggregate time involved across the above three stages of the cash conversion lifecycle:

$$CCC = DIO\ + DSO - DPO\ , \tag{2.7}$$

where *DIO* is days of inventory outstanding (also known as days sales of inventory (DSI)); *DSO* is days sales outstanding; *DPO* is days payables outstanding.

The Payables Deferral Period is the average length of time between when a company purchases supplies, materials, and labor from its suppliers on accounts payable and when it pays for them.

2.4 Financial ratio analysis.

Ratio analysis is a quantitative analysis of information contained in a company's financial statements. ratio analysis is used to evaluate various aspects of a company's operating and financial performance such as its efficiency, liquidity, profitability, and solvency.

Financial ratios can evaluate changes in the earnings of an investment over the years, or they can compare different enterprises in a particular industry at a certain point in the hour. Financial Ratio analysis can eliminate the impact of scale, used to compare the benefits and risks of different enterprises, so as to help investors and creditors make rational decisions

Ratio analysis can be divided into these parts:

2.4.1 Activity ratio analysis:

Activity ratios is the ratios refers to ratios that reflect the utilization efficiency of assets and the turnover speed. It measure the relative efficiency of a company based on its use of its assets, leverage, or other similar balance sheet items.

Activity ratio is divided into average collection period (ACP), accounts receivable turnover (ART), inventory turnover (IT) and total assets turnover (TAT).

The average collection period (ACP) is the amount of time it takes for a business to receive payments owed in terms of accounts receivable.it measures how long it takes to collect the company’s receivable.

The formula of the average collection period is:

$$ACP = \frac{Account\ receivable}{Revenues\ .360}\ . \qquad (2.8)$$

Accounts receivable turnover (ART) is the number of times per year that a business collects its average accounts receivable, it measures how long times the accounts receivable are rolled over during a year.

The formula of account receivable turnover is:

$$ART = \frac{Revenues}{Accounts\ receivable} . \quad (2.9)$$

Inventory turnover (IT) is the ratio which measure the number of its inventory is sold or used during a given period such as a year. It will help a company make better decision on its pricing, marketing and purchasing a new inventory.

The formula of inventory turnover is on the below:

$$IT = \frac{costs\ of\ goods\ sold}{average\ inventory} . \quad (2.10)$$

Total assets turnover (TAT) is a efficiency ratio which measure how successfully a company is using its assets to generate its revenue. If the higher the asset turnover ratio, the more efficient a company is. And the formula is showed on the below:

$$TAT = \frac{revenues}{total\ assets} . \quad (2.11)$$

2.4.2 Solvency ratio analysis

Solvency ratio is a key metric used to measure an enterprise's ability to meet its debt and other obligations. The solvency ratio indicates whether a company's cash flow is sufficient to meet its short-term and long-term liabilities.

The debt ratio is a financial ratio that measures what percentage of the company's assets financed by the debt. The debt ratio is defined as the ratio of total debt to total assets, expressed as a decimal or percentage:

$$Debt\ Ratio = \frac{Total\ Debt}{Total\ Assets} . \quad (2.12)$$

The greater the proportion of debt ratio, which means that more of the assets of an enterprise comes from debt, the less healthy of the enterprise.

The Debt/Equity (D/E) Ratio is calculated by dividing a company's total liabilities by its shareholder equity. it's similar to debt ratio:

$$\frac{Debt}{Equity} Ratio = \frac{Total\ Liabities}{Total\ Shareholder's\ Equity} . \quad (2.13)$$

The higher the ratio is, the higher the company's ability to repay long-term debt. It basically used to reflect the stability of the company's financial situation.

The interest coverage ratio is a debt ratio and profitability ratio used to determine how easily a company can pay interest on its outstanding debt, it tells the extending to which the company's operating cycle is able to meet current interest payment.

The formula of ICR is :

$$Interest\ Coverage\ Ratio = \frac{EBIT}{Interest\ Expense} , \quad (2.14)$$

where *EBIT* is earnings before interest and taxes. The interest coverage ratio is the ratio to measure the ability of a company to pay the interest for its liabilities. The greater it is. The greater of the company to pay for the interest.

2.4.3 Liquidity ratio analysis:

The current ratio is a liquidity ratio that measures a company's ability to pay short-term and long-term obligations.

The current ratio is based on the formula on the below:

$$Current\ ratio = \frac{current\ assets}{current\ liabilities} . \quad (2.15)$$

Generally speaking, if the higher the ratio is, the stronger the ability to liquidate the assets of an enterprise, the stronger the ability to repay the debt in the short term.

The quick ratio is an indicator of a company's short-term liquidity position and measures a company's ability to meet its short-term obligations with its most liquid assets.

The formula to calculate the quick ratio is:

$$Quick\ ratio\ = \frac{current\ assets - inventories}{current\ liabilities}\ . \tag{2.16}$$

Quick ratio deducts some illiquid assets compared to the current ratio.

The cash ratio is the ratio of a company's total cash and cash equivalents (CCE) to its current liabilities. This ratio tells creditors and analysts the value of current assets that could quickly be turned into cash. The formula of cash ratio is:

$$Cash\ ratio\ = \frac{cash\ +\ marketable\ securities}{current\ liabilities}\ . \tag{2.17}$$

This formula reflects the company's ability to pay its current debt without relying on inventory sales and receivables.

2.4.4 Profitability ratio analysis

Profitability ratios are a class of financial metrics that are used to assess a business's ability to generate earnings relative to its associated expenses.

Operating profit margin: Operating Profit Margin is a profitability or performance ratio used to calculate the percentage of profit a company produces from its operations, prior to subtracting taxes and interest charges

The formula is calculated by dividing the operating profit by total revenue, and expressing as a percentage:

$$OPM = \frac{EBIT}{Rev}\ , \tag{2.18}$$

where *EBIT* is the earning before interest and taxes, *Rev* is Revenues.

Net profit margin: The net profit margin is equal to how much net income or profit is generated as a percentage of revenue. Net profit margin is the ratio of net profits to revenues for a company or business segment. The formula is:

$$NPM = \frac{EAT}{Rev}\ , \tag{2.19}$$

where *EAT* is earning after taxes, *Rev* is revenues.

Return on equity (ROE) is a measure of financial performance calculated by dividing net income by shareholders' equity. When we have a higher ROE.
we will have a better company for ourselves to invest. The ideal ROE is higher than 15%. The formula is:

$$ROE = \frac{EAT}{Equity} . \tag{2.20}$$

ROA, also known as return on assets, is an indicator of how much net profit is generated per unit of asset Assets, it is measured by the profits of every unit of assets.

$$ROA = \frac{EBIT}{A} , or \tag{2.21}$$

$$ROA = \frac{OP}{A} , \tag{2.22}$$

where *EBIT* is earnings before interest and taxes, *A* is assets, *OP* is operating profit. ROA is one of the most widely used indicators to measure profitability in the industry, and the higher the index is, the better the utilization effect of company assets.

ROS, also known as return on sales, is widely used to assess the operating efficiency of the enterprise ratio, It is the ratio of total corporate profits to net sales revenue. ROS is a measure of the income level of the enterprise's sales revenue. It is a profit making ability indicator.

The higher the sales profit is, the higher the return of sales. Analysis and assessment of ROS are going to have a positive ability to improve the production structure and promote the reduction of costs.

The formula of ROS is:

$$ROS = \frac{Operating\ Profit}{Net\ Sales} . \tag{2.23}$$

2.5 Dupont analysis

(DuPont Analysis) is to use the relationship between several major financial ratios to analyze the financial position of an enterprise in an integrated manner.

Specifically, it is a classical method to evaluate the profitability of the company and the return level of shareholders ' equity and to evaluate the performance of enterprises from a financial point of view. The basic idea is to decompose the return on net assets of enterprises into multiple financial ratio products, which is helpful to the in-depth analysis and comparison of business performance. This analysis method was first used by DuPont in the United States, it was developed by E.I. du Pont de Nemours in 1919.

By adopting this method, the level of financial ratio analysis can be clearer and more organized, so as to provide convenience for report analysts to understand the operation and profitability of the enterprise comprehensively and carefully.

The net interest rate of equity, also known as the return on equity(ROE), is a comprehensive and strongest financial Analysis index, which is the core of DuPont's analysis system.

The formula of ROE is in the following sentences:

$$ROE = \frac{net\ profit}{equity} = \left(\frac{net\ income}{revenues}\right).\left(\frac{revenues}{total\ assets}\right).\left(\frac{total\ assets}{equity}\right). \quad (2.24)$$

The $\frac{net\ income}{revenues}$ are profit margin, $\frac{revenues}{total\ assets}$ are the assets turnover, $\frac{total\ assets}{equity}$ is the financial leverage.

Also the ROE is still can be write in this way :

$$ROE = \left(\frac{net\ income}{EBT}\right).\left(\frac{EBT}{EBIT}\right).\left(\frac{EBIT}{Rev}\right).\left(\frac{revenues}{total\ assets}\right).\left(\frac{total\ assets}{equity}\right). \quad (2.25)$$

we separate $\left(\frac{net\ income}{revenues}\right)$ into $\left(\frac{net\ income}{EBT}\right).\left(\frac{EBT}{EBIT}\right).\left(\frac{EBIT}{revenues}\right)$ in this formula, Where the $\left(\frac{net\ income}{EBT}\right)$ is tax burden, the $\left(\frac{EBT}{EBIT}\right)$ is interest burden, the $\left(\frac{EBIT}{revenues}\right)$ is EBIT margin.

After us distribute ROE into different ratios. We are going to use different method to analysis the small change of each ratios reflected to the basic ROE ratio. And we are going to use 3 different methods to analysis the influence quantification. It's gradual change, logarithmic decomposition and functional decomposition method.

In the calculate of changes in and indicator, we are going to use absolute deviation and relative deviation in it. Here we are going to show you the formula on the below:

$$\Delta x_{absolute} = x_1 - x_0 \,, \tag{2.26}$$

$$\Delta x_{relatively} = \frac{x_1 - x_0}{x_0} \,. \tag{2.27}$$

Method of gradual changes

Method of gradual change is working with absolute changes in component ratios. The formula of method of gradual change is as follows:

$$\begin{aligned} \Delta x_{a1} &= \Delta a_1 \cdot \Delta a_{2,0} \cdot \Delta a_{3,0} \cdot \frac{\Delta y_x}{\Delta x} \,, \\ \Delta x_{a2} &= \Delta a_{1,1} \cdot \Delta a_2 \cdot \Delta a_{3,0} \cdot \frac{\Delta y_x}{\Delta x} \,, \\ \Delta x_{a3} &= \Delta a_{1,1} \cdot \Delta a_{2,1} \cdot \Delta a_3 \cdot \frac{\Delta y_x}{\Delta x} \,, \end{aligned} \tag{2.28}$$

And the formula of Δy_x is:

$$\Delta y_x = \Delta x_{a1} + \Delta x_{a2} + \Delta x_{a3} \,, \tag{2.29}$$

where x is basic ratio, Δx is absolute change in the basic ratio, a is component ratio, Δa is absolute change in the component ratio, Δx_{ai} is absolute change in the basic ratio influenced by the change in the first (a_1) component ratio.

Logarithmic decomposition method

Logarithmic decomposition method is more convenient than the first because we are using just 1 formula for the influence quantification. The formula is on the below:

$$\Delta x_{ai} = \frac{ln\, I_{a_i}}{ln\, I_x} \,.\, \Delta y_x \,, \tag{2.30}$$

The formula of Δy_x is:

$$\Delta y_x = \sum_i \Delta x_{a_i} \,, \tag{2.31}$$

where *x* is basic ratio, *Δx* is absolute change in the basic ratio, $I_x = \frac{x_1}{x_0}$ is index of change in the basic ratio, $I_a = \frac{a_{i,1,}}{a_{i,0,}}$ is index of change in component ratio.

Functional decomposition method

Functional decomposition method works with relative changes in basic and component ratios, it's applicable regardless of the signs of the relative changes. The formula is :

$$\Delta x_{a_1} = \frac{1}{R_x} \cdot R_{a_1} \cdot (1 + \frac{1}{2} \cdot R_{a_2} + \frac{1}{2} \cdot R_{a_3} + \frac{1}{3} R_{a_2} \cdot R_{a_3}) \cdot \Delta y_x \,,$$

$$\Delta x_{a_2} = \frac{1}{R_x} \cdot R_{a_1} \cdot (1 + \frac{1}{2} \cdot R_{a_1} + \frac{1}{2} \cdot R_{a_3} + \frac{1}{3} R_{a_1} \cdot R_{a_3}) \cdot \Delta y_x \,, \tag{2.32}$$

$$\Delta x_{a_3} = \frac{1}{R_x} \cdot R_{a_1} \cdot \left(1 + \frac{1}{2} \cdot R_{a1} + \frac{1}{2} \cdot R_{a_2} + \frac{1}{3} R_{a_1} \cdot R_{a_2}\right) \cdot \Delta y_x \,.$$

The formula to calculate R_x , R_{a_i} and Δy_x is showing on the below:

$$\Delta x^{relat} = R_x = \frac{x_1 - x_0}{x_0} \,, \tag{2.33}$$

$$\Delta a^{relat} = R_{a_i} = \frac{a_1 - a_0}{a_0} \,, \tag{2.34}$$

$$\Delta y_x = \Delta x_{a1} + \Delta x_{a2} + \Delta x_{a3} \,. \tag{2.35}$$

3 Financial Characteristics of Hella Company

In this chapter. We are going to introduce some basic information and financial characteristics of Hella. Like the history or competition of Hella corporation. Finally, we are going to use horizontal and vertical common-size analysis method to do some comparisons of the financial characteristics of Hella.

3.1 Basic introduction to Hella

Hella KGaA Hueck & Co. (stylized as HELLA) is a global family-owned company with 40,000 employees from more than 35 countries and 125 production area.

Hella is committed to the development and production of vehicle components, lighting technology systems and electronic equipment of the vehicle.

The after-sale department of Hella is one of the largest automotive accessories, diagnostics and services producer in Europe. Hella's special applications department is also dedicated to the development of specialized products for specialty vehicles and completely independent application technologies, such as road or industrial lighting systems.

Hella is one of the 100 biggest industry company in Germany, which created €7.1 billion sales in 2017/2018 fiscal year. 28% of Hella sales came from the Asia Pacific region/The rest of the world, and 21% from the American continent. Hella is one of the top 50 global automotive suppliers in the world.

3.2 History and competition of Hella

We are going to start introducing the history of Hella in 2 ways, First is the history of Hella corporation history of the production of Hella. And next we are going to introduce the competitors of Hella and the position of Hella in the whole automotive market.

3.2.1 History of Hella

History of Hella corporation:

June 11, 1899, Mr. Sally Windmüller established the "Westfälische Metall-Industrie Aktien-Gesellschaft" (WMI) company in the German city of Lipljan, It's the born of Hella. At this time, Hella is still a factory that specializes in producing lanterns, headlights, horns, and accessories for bicycles, carriages and cars. The most likely reason for the origin of Hella's trademark is that Windmüller chooses Hella nickname in 1908 in memory of his wife, Helene.

In 1937, the number of employees in Hella reached 1000 for the first time. But after World War II, the number of Hella employees was reduced to just 45. Hella set up its first international plant in Australia in 1961 and officially showed up on the international stage. And it changed its name to Hella KG Hueck & Co.at 1986.

In 1996, Hella has opened joint ventures in China and South Korea, an increasing number of international activities have been activated since then.

In 2003, Hella changed its name to Hella KGaA Hueck & Co. due to the enterprise transformation.

In 2014, Hella opened the HELLA Globe in Lipljan. Not far from the company's headquarters, the new building will serve as a welcome, conference and Sports Center, open to HELLA employees in Germany and Overseas.

HELLA shares were going to the public on the Frankfurt Stock Exchange on November 11, 2014. New shares are priced at € 27.50 of each one. In the January 2015, HELLA's stock listing earned it the 2014 European Stock Issue award.

History of production of Hella

In 1908, the company's first outstanding Innovation of the product-"System HELLA" acetylene headlights. And Hella provided headlights for Volkswagen's first prototype in 1936.

In 1957, Hella took the first step in the field of electronic components, inventing the first all-electronic flash Group. Hella is the first manufacturer to be approved to produce H4 (halogen) headlights.

In 1992, Hella's first generation of xenon headlights was put into mass production.

In 1996, Hella developed the first integrated accelerator pedal sensor that blends accelerator pedals, pedal power plants and sensors into a modular unit. Hella is the first company to production steering lights and dynamic steering lights.

In 2007, Hella releases a first front camera with traffic sign recognition. And it produces the dynamic headlight assist system to improve visibility in 2010.

In 2013, HELLA becomes the member of CAB Concept Cluster.

Through 2010 to 2018, the 20 millionth unit has rolled off the assembly line of Hella.

3.2.2 Competition of Hella

Through Hella's more than one century's life. There will always be a lot of competitors in competition with it. Here we are going to introduce some of it. And we can see how much progress Hella made to win the victory through it.

In the first part we are going to introduce the Magneti Marelli, which is an international group dedicated to the design and production of high-tech systems and components in the automotive industry.

Magneti Marelli is an international company founded in Italy in 1919 which has a turnover of € 8,2 billion in 2017, about 44,000 employees, 85 production units and 15 R&D Centres. The Magneti Marelli Group has a presence in 20 countries.

And then, It's time for Valeo, which is the top automotive supplier in the automotive industry and a partner for all automotive manufacturers worldwide.

Valeo story started in 1923 in a workshop outside of Paris, France. From the over 90 years history, Valeo has become a word-leading automotive supplier in 33 countries.

By contrast, Hella occupies one of a dominant position in the automobile lighting industry, which is a leader in the Lighting, Electronics and Aftermarket markets.

And we can find the difference is not even comparable on these two. Even on the comparison between another company Automotive Lighting. Hella still have more than double sales than it.

3.3 Common-size analysis of Hella

The common-size analysis is the analysis of the changes in the data which are from financial statement over time. In this part, we will introduce some data of Hella company by common-size analysis from 2014 to 2018. We are going to use this data to identify the trends and main differences of the data from Hella company's financial statements.

At first, I'm going to show you the consolidated income statement from fiscal year 31.5.2015 to fiscal year 31.5.2018 in the flowing table *Tab. 3.1:*

Tab. 3.1 Consolidated income statement of Hella from 2015 to 2018 (1 thousand €)

	2015	***2016***	***2017***	***2018***
Revenues/sales	**5,834,691**	**6,351,889**	**6,584,748**	**7,060,342**
Cost of sales	-4,280,770	-4,663,691	-4,772,735	-5,094,043
Gross profit	**1,553,921**	**1,688,198**	**1,812,014**	**1,966,299**
Operating expenses	-1,124,418	-1,268,406	-1,304,844	-1,392,012
EBIT	**429,503**	**419,792**	**507,170**	**574,287**
Financial income	38,453	32,515	15,027	29,614
Financial costs	-74,331	-72,027	-59,274	-73,751
Net financial result	**-35,878**	**-39,512**	**-44,247**	**-44,137**
EBT	**393,625**	**380,820**	**462,923**	**530,149**
Income Tax	-98,172	-108,419	-119,816	-140,099
EAT	**295,453**	**271,861**	**343,107**	**390,051**

From the data we show on the behind. We will find the basic data of income statements. We can find in last 4 years (2015-2018), the revenues had increased rapidly, and meantime the cost of sales changed because of the change of supply. Because of the change of revenues is larger than the cost of sales. The gross profit increase a lot in this years. And the decreasing of financial costs and increasing of financial income made EBT increasing. But in these years, year 2017 and 2018 is such particular. The financial income of 2017 decrease a lot compared to another years, and it still hadn't returned to a simple degree as the 2015 and 2016 does.

We can find the reason of the change happened in Hella's income statement because in 2017 and 2018 Hella made a lot of change in its production area and made any business changes such as developing its subsidiary company HELLA Aglaia in Berlin.

Generally speaking. The Hella company grows healthily.

And then the consolidated balance sheet （*Tab. 3.2*）and comparison between fiscal year 31.5.2015 to fiscal year 31.5.2018 it is on the below for the calculation of common-size analysis:

Tab. 3.2 The consolidated balance sheet of Hella from 2015 to2018 (1 thousand €)

	2015	**2016**	**2017**	**2018**
Current Assets	2,637,867	2,635,062	3,011,167	3,125,981
Non-current assets	2,281,080	2,360,239	2,627,030	2,795,243
Assets	**4,916,947**	**4,995,301**	**5,638,197**	**5,921,224**
Current Liabilities	1,349,468	1,401,923	1,810,454	1,670,982
Long-term liabilities	1,657,785	1,614,728	1,601,999	1,771,977
Equity	**1,909,694**	**1,978,650**	**2,225,744**	**2,478,265**
Equity and liabilities	**4,916,947**	**4,995,301**	**5,638,197**	**5,921,224**

In balance sheet. We can see that the assets grows rapidly when current liabilities decreased. The long-term assets grows less in 2018 and 2017 than any other years. And non-current liabilities grows gently with a small fluctuate. And shareholder's equity grows gently either. In current liabilities, Year 2018 also has smaller change than other years.

From the progress Hella made in 2018, we will find the reason why Hella has the change compared with another years. HELLA has opened a new plant in Lithuania, launching a new joint venture dealing in electronic components with the company BHAP in China, It made Hella transform more current liabilities into long-term liabilities.

3.3.1 Vertical common-size analysis of Hella

In the vertical common-size analysis, Vertical common-size analysis needs to ensure the baseline before analyzing it at first. In the vertical common-size analysis of the balance sheet, we can select total assets or total liabilities and equity as a benchmark. In the vertical common-size analysis of income statement, we can select total revenue as the analysis benchmark. The scale of each item in the baseline will be calculated later. Finally, we can sum up the evolution of these projects and get our results.

Vertical common-size analysis of balance sheet

We are going to divide the vertical common-size analysis of Balance sheet Into 2 parts:

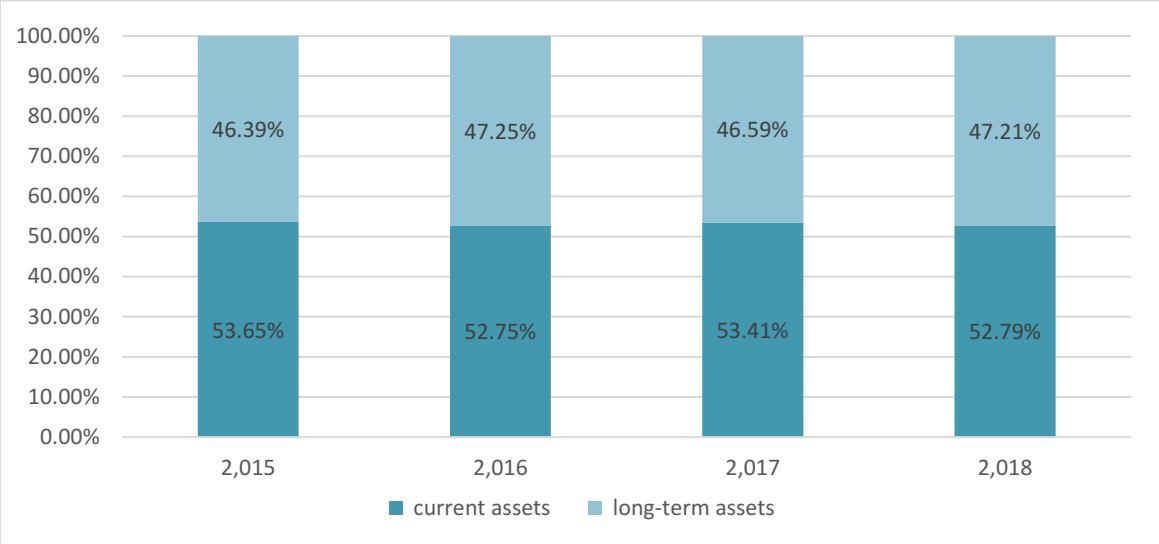
- 1. vertical common-size analysis of assets.
- 2. vertical common-size analysis of liabilities and shareholder's equity.

At first, we are going to introduce the vertical common-size analysis in the assets. Here is the Tab. 3.3 and Chart. 3.1 which shows the differences of the proportion of Hella from fiscal year 31.5.2015 to fiscal year 31.5.2018 in it on the below:

Tab. 3.3 The proportion of assets of Hella (2015-2018)

	2,015	2,016	2,017	2,018
Current assets	**52.79%**	**53.41%**	**52.75%**	**53.65%**
Cash and cash equivalents	12.26%	11.71%	13.90%	11.62%
Financial assets	8.24%	6.58%	5.58%	5.62%
Trade receivables	17.07%	18.77%	18.94%	19.70%
Other receivables and non-financial assets	3.09%	2.93%	2.76%	2.52%
Inventories	12.38%	12.16%	11.77%	12.86%
Current tax assets	0.50%	1.02%	0.46%	0.83%
Non-current assets held for sale	0.13%	0.06%	0.00%	0.03%
Long-term assets	**47.21%**	**46.59%**	**47.25%**	**46.39%**
Intangible assets	4.49%	4.50%	4.52%	5.26%
Property, plant and equipment	32.79%	33.98%	33.82%	33.68%
Financial asset	0.40%	0.34%	0.53%	0.63%
Investments accounted for using equity method	5.43%	5.23%	4.86%	4.93%
Deferred tax assets	2.41%	2.46%	2.08%	1.87%
Other non-current assets	0.87%	0.73%	0.78%	0.84%

Chart. 3.1 The proportion of assets of Hella (2015-2018)



In our data, we can find the proportion of Current assets and long-term assets is stable when company grows rapidly. The proportion of long-term assets is always smaller than the proportion of current assets. It shows us that the company develop healthily. It keeps a good situation in it's financial structure. And in 2017, The proportion of Current assets and long-term assets has a sharply change.

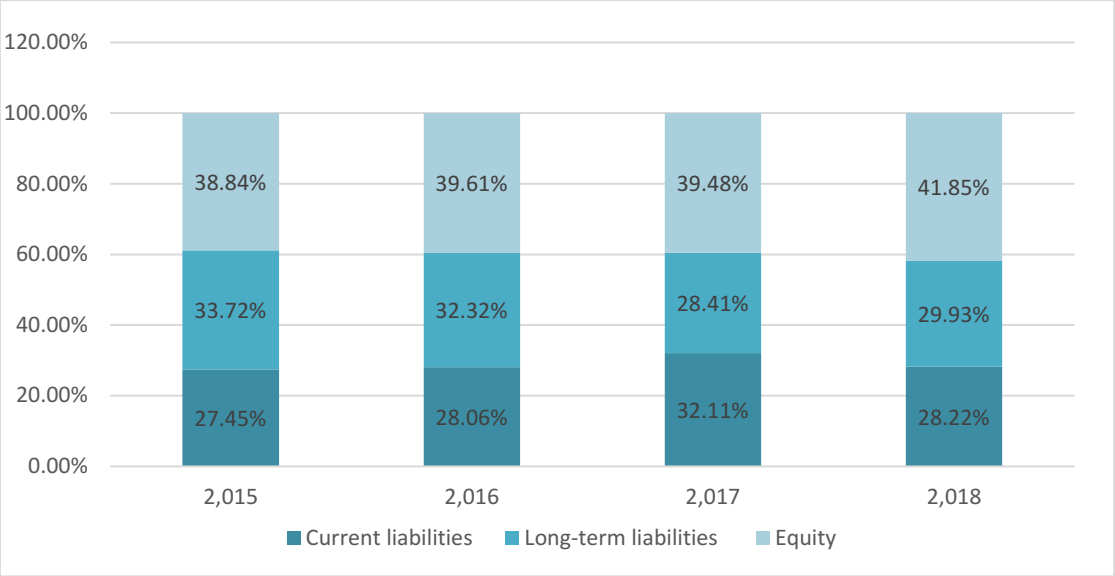
Combined the data we showed on the upside with the history of Hella's events and production of it's products. We are going to find out Hella get a very good progress in the production of some new modular lighting series. It still get a good relationship with Audi Sport TT Cup. It start using some current assets of itself to transfered it to the new e-commerce activities in the Aftermarket segment in Northern and Eastern European territories, which cause the long-term assets changed.

Then we are going to introduce the vertical common-size analysis in the liabilities. Here is the Tab. 3.4 and Chart. 3.2 which shows the differences from fiscal year 31.5.2015 to fiscal year 31.5.2018 in it on the below:

Tab. 3.4 The proportion of liabilities and equity of Hella (2015-2018)

	2,015	**2016**	**2017**	**2018**
Current liabilities	**27.45%**	**28.06%**	**32.11%**	**28.22%**
Financial liabilities	2.04%	1.74%	6.04%	0.71%
Trade payables	11.67%	12.69%	11.93%	12.02%
Current tax liabilities	0.93%	1.16%	1.08%	1.19%
Other liabilities	11.33%	11.17%	11.28%	12.06%
Provisions	1.48%	1.31%	1.78%	2.24%
Non-current liabilities	**33.72%**	**32.32%**	**28.41%**	**29.93%**
Financial liabilities	21.13%	21.32%	18.38%	19.69%
Deferred tax liabilities	0.51%	0.52%	0.57%	0.68%
Other liabilities	4.81%	3.87%	3.23%	3.77%
Provisions	7.27%	6.62%	6.23%	5.79%
Equity	**38.84%**	**39.61%**	**39.48%**	**41.85%**

Chart. 3.2 The proportion of liabilities and equity Hella (2015-2018)



In our charts, we can find the proportion of long-term liabilities is decreasing from 2015-2018 with the proportion of current liabilities grows stable. And shareholders can get more money from the company's development. And a strange difference in these year, 2017 fiscal year's current liabilities and long-term liabilities has decreased. Meantime the shareholder's equity has grown a lot compared to the 2016 fiscal year.

In detail, we can find the reason of change in Hella's financial items in 2017 is the current financial liabilities has grown a lot in year 2017 and decreased in a very low level in 2018, and long-term financial liabilities decreased in 2017 and 2018, It means Hella has using some short-term financial instructions to hedge the long-term financial liabilities.

Connect the change to the real business decision of Hella. In 2017 fiscal year, HELLA is expanding its international production capacities, getting strong venture with OEM Hengst Filtration, start sales activities of filtration products and further developing its subsidiary company HELLA Aglaia in Berlin. All of the progress that Hella made this year decreased the liabilities and create a very large change in shareholder's equity.

Vertical common-size analysis of the income statement

In a vertical common-size analysis of income statement. We are going to use vertical common-size analysis to study the income statement from fiscal year 31.5.2015 to fiscal year 31.5.2018.

Tab. 3.5 The proportion of each items divide into total revenues of Hella (2015-2018)

	2015	2016	2017	2018
Revenues/sales	100.00%	100.00%	100.00%	100.00%
Cost of sales	73.37%	73.42%	72.48%	72.15%
Gross profit	**26.63%**	**26.58%**	**27.52%**	**27.85%**
Operating expenses	19.27%	19.97%	19.82%	19.72%
EBIT	**7.36%**	**6.61%**	**6.52%**	**5.95%**
Financial income	0.66%	0.51%	0.58%	0.46%
Financial costs	1.27%	1.13%	0.90%	1.04%
Net financial result	**0.61%**	**0.62%**	**0.54%**	**0.56%**
EBT	**6.75%**	**6.00%**	**5.98%**	**5.39%**
Income tax	1.68%	1.71%	1.49%	1.54%
EAT	**5.06%**	**4.28%**	**4.49%**	**3.85%**

When we are analyzing the Tab. 3.5, we can find the cost of sales in 2017 and 2018 decreased to 72.48% and 72.15% for total revenues. And because of the changes of operating expenses, the EBIT is not as well as we thought in these 2 years. The financial income decreased a lot in 2017 and 2018, although in 2018 there was a small strengthen of it(from 0.54% to 0.56%), but it still didn't reach the normal level. And the financial costs in 2017 has decreased.

And then we are going to connect the financial data to the real thing happened on the Hella on 2017 and 2018. Hella expand its new international production capacities to China, Mexico, Lithuania and India. It decreased the cost on supply the production, which is the key to decrease the cost of sales. And it also opened a new joint venture dealing in electronic components with the company BHAP on China, which also directly cause the decrease the cost of sales in 2018. And also because of the launching of many new production area or plants. It also decreased the financial income of Hella.

Then we are going to divide the study the study the change of income statement by cash inflows and cash outflows. Firstly we can divide each sales into total revenues.

Here we are showing the proportion of total sales divide into total revenues of Hella from 2015 to 2018 on the Tab. 3.6:

Tab. 3.6 The proportion of total sales divide into total revenues of Hella (2015-2018)

	2015	2016	2017	2018
Total sales	100%	100%	100%	100%
Sales from the sale of goods	97.10%	97.35%	97.10%	97.20%
Sales arising from the rendering of services	2.90%	2.65%	2.90%	2.80%

In this part. From the data showed on the upside. We can find although the sale on the goods is still the biggest part of the sale, the sales arising from the rendering of goods has become more and more important in this years.

And in 2017, 2018 fiscal year, The proportion of sales arising from the rendering of goods returned to the original level. It shows to us that after the big events of Hella on 2016. The financial situations are returned back.

And then, here is the part of dividing each expenses into total expenses.

We are going to use Tab. 3.7 to show you the proportion of cost of sales into total expenses of Hella from fiscal year 2015 to 2018:

Tab. 3.7 The proportion of cost of sales into total expenses of Hella (2015-2018)

	2015	2016	2017	2018
Total expenses	100%	100%	100%	100%
Cost of materials	70.68%	70.94%	63.40%	64.95%
Personnel expenses	15.75%	13.95%	14.12%	12.78%
Depreciation/Amortization	6.24%	6.99%	5.60%	6.40%
Other	6.94%	7.96%	6.23%	7.29%
Reclassification of functional costs	0.39%	0.15%	0.35%	0.14%

In Tab. 3.7, we can find the cost of materials decreased stably in these years. The costs of material seems to be regularly changing in this four years. And personal expenses decreased a lot. In 2017, the Depreciation/Amortization is the lowest in these years.

Most possibly reason for the changes of Hella in these year must be the development of production technology, and cut off some industry which is outdated. It could use less people to produce more product. We can find HELLA has officially opened its New Development Center for Automotive Lighting Technology in Sindelfingen, and opened new plants in China, Mexico, Lithuania and India.

The transaction of the industry will cut off a lot of unnecessary human work, and decrease a lot of cost on personal expenses.

3.3.2 Horizontal common-size analysis of Hella

Horizontal common-size analysis is a part of common-size analysis to analysis financial statements data over the time or their changes used a given period as a base, which we used to study the development of the company's business performance or financial situation changes.

In horizontal common-size analysis, we are going to calculate the absolute change and relative change of the financial situation of Hella.

In absolute change, we are going to use the previous year as the benchmark; In relative change, we are going to use the item itself as the benchmark.

First, we are going to study the absolute and relative change of income statement from fiscal year 31.5.2015 to fiscal year 31.5.2018 from the Tab. 3.8 and Tab. 3.9 we shows on the below:

Tab. 3.8 Absolute change of income statement of Hella from 2014 to 2018 (1 thousand €)

Absolute change	**2015/2016**	**2016/2017**	**2017/2018**
Revenues/sales	**517,198**	**232,859**	**475,594**
Cost of sales	-382,921	-109,044	-321,308
Gross profit	**134,277**	**123,816**	**154,285**
Operating expenses	-143,988	-36,438	-87,168
EBIT	**-9,711**	**87,378**	**67,117**
Financial income	-5,938	-17,488	14,587
Financial costs	2,304	12,753	-14,477
Net Financial result	**-3,634**	**-4,735**	**110**
EBT	**-12,805**	**82,103**	**67,226**
Income tax	-10,247	-11,397	-20,283
EAT	**-23,592**	**71,246**	**46,944**

Tab. 3.9 Relative change of income statement of Hella (2014-2018)

Relative change	**2015/2016**	**2016/2017**	**2017/2018**
Revenues/sales	**8.14%**	**3.54%**	**6.74%**
Cost of sales	8.21%	2.28%	6.31%
Gross profit	**7.95%**	**6.83%**	**7.85%**
Operating expenses	11.35%	2.79%	6.26%
EBIT	**-2.31%**	**17.23%**	**11.69%**
financial income	-18.26%	-116.38%	49.26%
financial costs	-3.20%	-21.52%	19.63%
Net financial result	**9.20%**	**10.70%**	**-0.25%**
EBT	**-3.36%**	**17.74%**	**12.68%**
Income Tax	9.45%	9.51%	14.48%
EAT	**-8.68%**	**20.76%**	**12.04%**

From all the tabs on the upside. We can find the proportion of grow of revenues on 2017 decreased and come back in 2018.The cost of sales also decrease a lot in our comparison in the meantime of 2016 and 2017. The operating expenses is the same as

the cost of sales. The financial income decreased a lot in 2017. And it also has the lowest revenues in 2017. Fiscal year 2017 also has the biggest financial costs in these years. But because of the highest proportion of cost of sales in 2015, the gross profit is the lowest. There must have happened a big event on 2017 fiscal year.

It shows to us that after a decreasing of grow proportion, Hella changed its business method and become better.

The financial income decreased a lot in 2017 because HELLA is further expanding its e-commerce activities in the aftermarket segment. And in 2018 Hella is still use money from outside world for the aftermarket segment. And it's the reason why Hella has a such decreasing in financial income in 2017.

In my opinion. Hella use a lot of time and money in the open up the aftermarket segment and improve the supply chain in these years. Although it takes a lot, but also it would make Hella a healthier and more potential company in the future.

Then, we are going to introduce the horizontal common-size analysis of balance sheet of Hella of fiscal year 31.5.2015 to fiscal year 31.5.2018 from the Tab. 3.10 and Tab. 3.11 we showed on the below:

Tab. 3.10 Absolute change of balance sheet of Hella from 2014 to 2018 (1 thousand €)

	2015/2016	**2016/2017**	**2017/2018**
Current assets	-2,805	376,105	114,814
Non-current assets	79,159	266,791	168,213
Assets	**78,354**	**642,896**	**283,027**
Current liabilities	52,455	408,531	-139,472
Non-current liabilities	-43,057	-12,729	169,978
Equity	**68,956**	**247,094**	**252,521**
Equity and liabilities	**78,354**	**642,896**	**283,027**

Tab. 3.11 Relative change of balance sheet of Hella (2014-2018)

	2015/2016	**2016/2017**	**2017/2018**
Current assets	-0.11%	12.49%	3.67%
Non-current assets	3.35%	10.16%	6.02%
Assets	**1.57%**	**11.40%**	**4.78%**
Current liabilities	3.74%	22.57%	-8.35%
Long-term liabilities	-2.67%	-0.79%	9.59%
Equity	**3.49%**	**11.10%**	**10.19%**
Equity and liabilities	**1.57%**	**11.40%**	**4.78%**

In the Tab. 3.10 and Tab. 3.11 , The current assets increased a lot in the year 2015,2017 and 2018. It decreased in the year 2016 to 0.11%. The non-current assets increased in both 4 years, But the 2016 gets the smallest progress. The current liabilities decreased a lot in the year 2015 and 2018, and it still has a small decrease in the year 2016. But in the year 2017, it increased a lot. The non-current liabilities decreased in year 2015,2016 and 2017. But in the year 2018, It has a sharply increase. The equity increased in both 4 years, But in the year 2015 it grows the most, and in the year 2016 it grows the smallest.

We can find in the year 2016-2018, Hella is using their power to develop their wholesale business and further expanding its e-commerce activities in the Aftermarket segment. We can make a reasonable speculation that why the year 2015 grows the most is because Hella shares are traded for the first time on the Frankfurt Stock Exchange as a 27.50 Euros initial trading price.

In the year 2017, because the built up of Hella New Development Center for Automotive Lighting Technology in Sindelfingen, Hella have a relatively big change in its fix assets and current liabilities. And it also show in the year 2018 because of launching a new joint venture dealing in electronic components with the company BHAP . And Hella made a very good progress in the relationship with its partners and their production development in the year 2017-2018. It has set a new standard of its work.

Year 2016 is sure the worst year of Hella in these years. It had made none progress expect the aftermarket e-commerce activities.

4 Financial analysis of Hella

In this chapter, we are going to use financial data of Hella in 2015-2018 into the financial analysis of Hella. This chapter will be taken into 5 parts, the operating cycle analysis will be in the first part, and next 4 parts will be used in analyzing the 4 different financial ratios. And finally, it's the Dupont analysis and influence quantification.

4.1 Operating cycle analysis of Hella

Operating cycle is a measure of the operating efficiency and working capital management of a company. In this chapter, we are going to use the financial data of Hella in these years to analysis the number of days a company takes in realizing its inventories in cash.

At first, we are going to use inventory conversion period (ICP) and receivable conversion period (RCP) to analysis the period of the Operating cycle.

For calculation of the ICP, we will use the data shown on the tab. 4.1 below:

Tab. 4.1 The Inventory conversion period of Hella from 2015-2018 (1000€)

	2015	**2016**	**2017**	**2018**
Cost of sales	4,280,770	4,663,691	4,772,735	5,094,043
Inventories	608,853	607,584	663,533	761,488
Inventory conversion period (days)	**7.03**	**7.68**	**7.19**	**6.69**

The inventory conversion period reflected the ability of a company to produce and sell its products. The short the inventory conversion period is the greater of a company to produce and sell its product. From the data we analysis in this table, we can find that cost of sales increased in these 4 years, but in the year 2017 the increase is less than the average increase than another years. And in the inventory, The year 2015 and 2016 is almost the same, but in year 2017 and 2018, it increased a lot. It reflect on the ICP which

shows in the year 2017 and 2018 is still decreased a lot in this two years. And we can find the ability of Hella to sell and produce its products is a lot more in the year 2017.

And the reason of the change of its ability is mostly because in the year 2017, Hella expands international production capacities.

For calculation of the receivables conversion period (RCP), we are going to use the data shown on the Tab. 4.2:

Tab. 4.2 The Receivables conversion period of Hella from 2015 to 2018 (1000€)

	2015	**2016**	**2017**	**2018**
Trade receivables	839,322	937,471	1,067,979	1,166,571
Revenues/sales	5,834,691	6,351,889	6,584,748	7,060,342
Receivables conversion period (days)	**6.95**	**6.78**	**6.17**	**6.05**

The inventory conversion period is the ratio reflects the company to receive the payments from the selling of products. Obviously the shorter the term is. The better the ability of the company to receive the money. From the data showed on the upside, We can find the trade of receivables increase a lot in the year 2017 and 2018. The revenues also increase a lot in these 4 years, receivables conversion period of Hella decreased in the four years. But most quickly is in the year 2017. From the calculation of inventory conversion period and receivables conversion period on the below, we can easily calculate the cash conversion period (CCP) of Hella. Here is the Tab. 4.3 which show it on the below:

Tab. 4.3 The cash conversion period of Hella from 2015 to 2018 (days)

	2015	**2016**	**2017**	**2018**
Cash conversion period(days)	13.98	14.45	13.36	12.74

From the table (Tab. 4.3) showed on the upside, here we can find that the cash conversion period of Hella increased a lot in 2016 and then sharply decrease in 2016 and 2017.

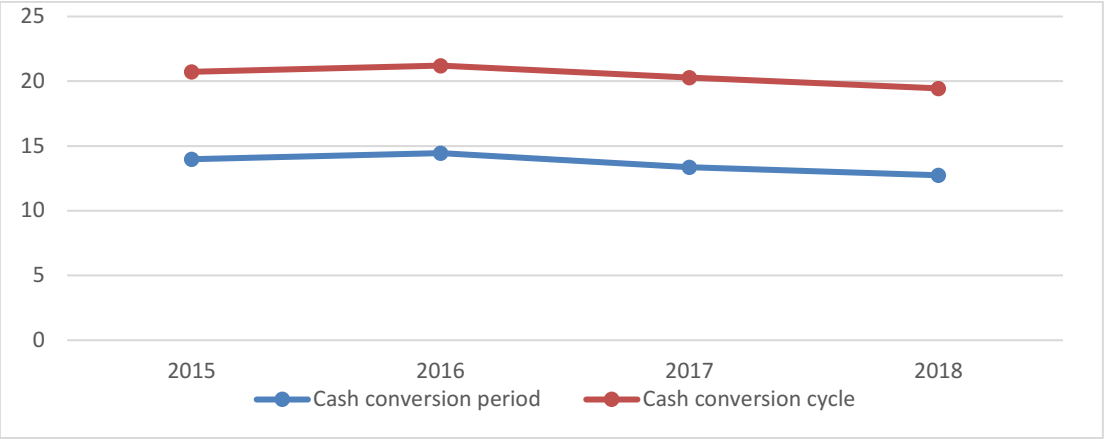
And then we are going to calculate the cash conversion cycle (CCC) of Hella by combine the days of inventory outstanding (DIO), days sales outstanding (DSO) and days payables outstanding (DPO) on the below Tab. 4.4:

Tab. 4.4 The cash conversion cycle of Hella from 2015 to 2018 (days)

	2015	**2016**	**2017**	**2018**
Days of inventory outstanding	7.03	7.68	7.19	6.69
Days sales outstanding	6.95	6.78	6.17	6.05
Days payables outstanding	6.74	6.75	6.93	6.71
Cash conversion cycle	**20.72**	**21.21**	**20.29**	**19.45**

From the cash conversion period of Hella, it also has a sharply increase in 2016 and then decrease in next two years just like CCP. Here is Chart. 4.1 show the comparison of this two:

Chart. 4.1 Comparison of cash conversion period and cash conversion cycle of Hella (2015-2018)



Cash conversion period reflects the ability of a company to convert its investments in inventory and other resources into cash flow and sales. And the shorter the time is,

The greater of a company to convert its investments in inventory and other resources into cash flow and sales.

From the data we showed on the upside, we can find the DIO and DSO decrease a lot in 2017, and opposite the DPO increased. When we compare the CCP and CCC We can notice from this two that the range of the change is almost the same. It mostly because the change Hella has made in 2017-2018 in the new industry which opened in China, India and other countries.

4.2 Liquidity ratio analysis of Hella

Liquidity ratio refers to the ratio of cash to current liabilities of a company, reflecting the immediate liquidity of an enterprise, and the cash refers to cash and cash equivalents, which can show the ability of an enterprise to repay its maturing debt immediately.

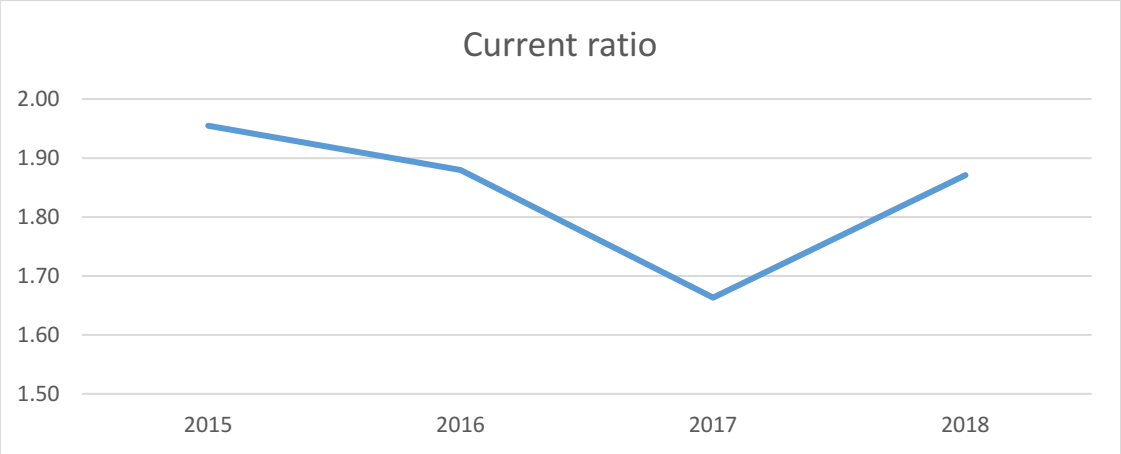
In this part. We are going to analysis the Liquidity ratio of Hella. And we will separate the analysis of liquidity ratio into 3 parts. First is the current ratio of Hella ,and then it's the quick ratio and cash ratio. Finally we will analysis the ART and ACP of Hella.

At first, we will analysis the current ratio. Here is the data of current ratio of Hella which is showing on the Tab. 4.5 and Chart. 4.2 on the below:

Tab. 4.5 Current ratio of Hella from 2015 to 2018 (1000€)

	2015	**2016**	**2017**	**2018**
Current liabilities	2637867	2635062	3011167	3125981
Current assets	1349468	1401923	1810454	1670982
Current ratio	**1.95**	**1.88**	**1.66**	**1.87**

Chart. 4.2 Current ratio of Hella (2015-2018)



The current ratio measures a company's ability to pay short-term and long-term obligations. And the higher the ratio is, the stronger the ability to liquidate the assets of an company, the stronger the ability to repay the debt in the short term.

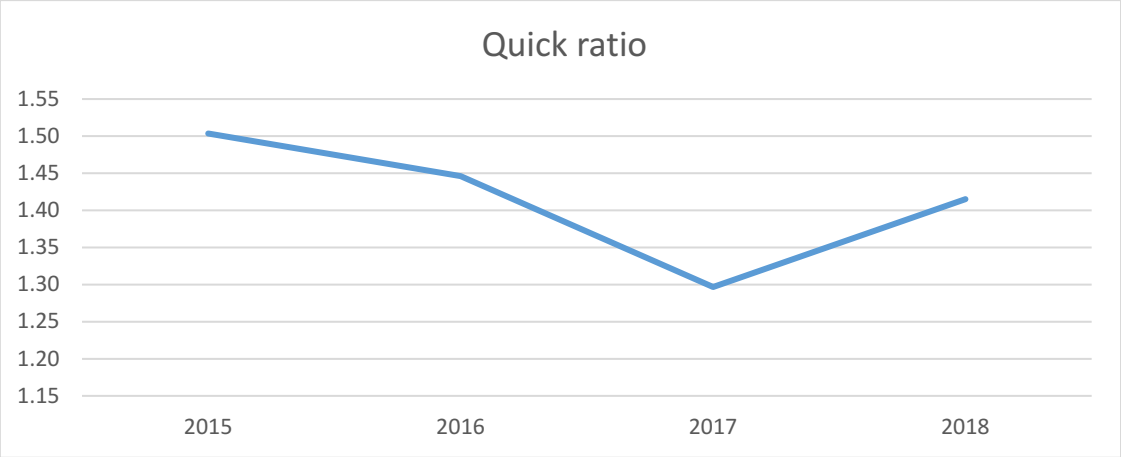
From the data we showed on the upside, we can find the current liabilities increase a lot in the year 2017 and 2018, mostly in the year 2017. And current assets of Hella increase a lot in 2017 either. And decrease in 2018. The data reflected on the current ratio is in 2017 , it has reached a very low level. It mostly because HELLA is expanding its international production capacities and HELLA successfully completes refinancing of 2014/2017 bond.

Then we are going to analysis the quick ratio of Hella in the Tab. 4.6 and Chart. 4.3 on the below:

Tab. 4.6 The quick ratio of Hella from 2015 to 2018 (1000€)

	2015	**2016**	**2017**	**2018**
Current liabilities	2637867	2635062	3011167	3125981
Current assets	1349468	1401923	1810454	1670982
Inventories	608,853	607,584	663,533	761,488
Quick ratio	**1.50**	**1.45**	**1.30**	**1.42**

Chart. 4.3 The quick ratio of Hella (2015-2018)



The quick ratio measures a company's short-term liquidity position, and measures a company's ability to meet its short-term obligations with its most liquid assets. The higher it is, the higher the ability it is.

From the data we showed on the upside. We can find the current liabilities increase a lot in the year 2017 and 2018, mostly in the year 2017. Current assets of Hella increase a lot in 2017. And inventories increase a lot in 2017 and 2018. But the quick ratio of Hella decreased a lot in 2017. In 2018, it has gone up in 2018. The reason of it is Hella expands its international production capacities and software. The ability of it to reduce the operating cost increase a lot. And meantime the ability of Hella to sell its products hasn't increase like it in the meantime. It cause the inventory couldn't transform to cash, which leads the problem.

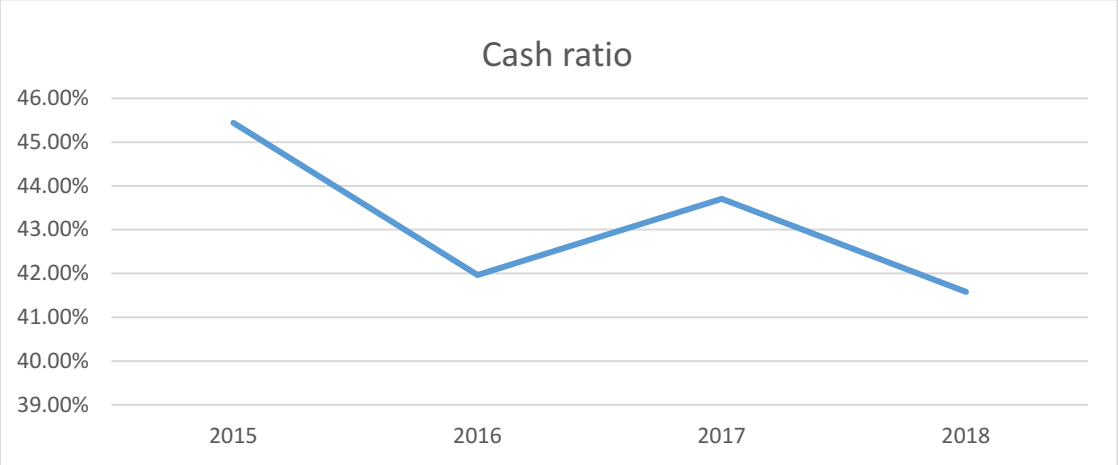
Then we are going to analysis the cash ratio of Hella. The data showed on the Tab. 4.7 and Chart. 4.4 on the below.

Tab. 4.7 Cash ratio of Hella from 2015 to 2018 (1000€)

	2015	**2016**	**2017**	**2018**
Current liabilities	2637867	2635062	3011167	3125981
Cash	602,744	585,134	783,875	688,187
Marketable securities	10,470	3,130	7,360	6,620
Cash ratio	**45.44%**	**41.96%**	**43.70%**	**41.58%**

From the Tab. 4.7, we can find the current liabilities increased a lot in 2017 and 2018. It grows from 2,635,062 in 2016 to 3,125,981 in 2018. And the cash is also increase to 783875 in 2017, and meantime the marketable securities decreased a lot from 10470 to 3130 in 2016, and recovered back in 2017.

Chart. 4.4 Cash ratio of Hella (2015-2018)



The cash ratio tells creditors and analysts the value of current assets that could quickly be turned into cash. The ratio is higher, the quicker of current assets to turn into cash.

In our chart. 4.4. We can find the cash ratio of Hella decrease in these 4 years, from 45.44% to 41.58% and in 2017 there is a small improve to 43.70%.

4.3 Activity ratio analysis of Hella

Activity ratios is the ratios measure the relative efficiency of a company based on its use of its assets, leverage, or other similar balance sheet items. It's refers to ratios whether a company is using its management doing a enough job for generating revenues and cash from its financial resources.

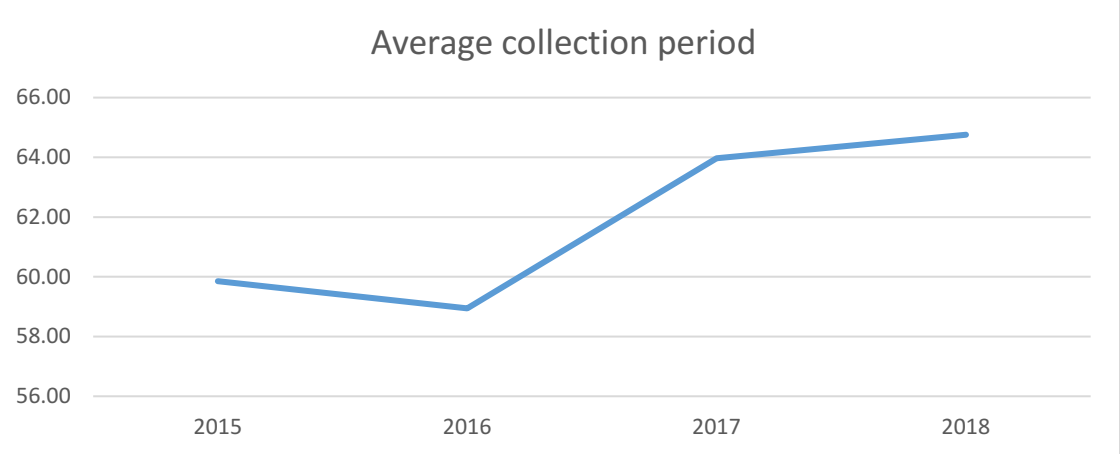
Here we are going to analysis the activity ratio of Hella. We will separate it into analysis of average collection period of Hella, account turnover of Hella, inventory turnover of Hella and total assets turnover of Hella.

At first, we will introduce the data of ACP of Hella on the Tab. 4.8 and Chart. 4.5 on the below.

Tab. 4.8 Average collection period of Hella from 2015 to 2018 (1000€)

	2015	**2016**	**2017**	**2018**
Account receivables	970,140	1,040,000	1,170,000	1,270,000
Revenues	5,834,691	6,351,889	6,584,748	7,060,342
Average collection period (days)	**59.86**	**58.94**	**63.97**	**64.76**

Chart. 4.5 Average collection period of Hella (2015-2018)



The average collection period (ACP) measures how long it takes a company to collect itself 's receivable. The shorter it is , The better is it.

From the data we showed on the upside. We can find that the account receivable grows stably from 2015-2018. And the revenues is also growing stable. And the average collection period of Hella is also growing stable. It because the speed of account receivables grows slower than the speed of the revenues.

Then, we are going to analysis the data of account receivables turnover in the Tab. 4.9 and Chart. 4.6 on the below.

Tab. 4.9 Account receivable turnover of Hella from 2015 to 2018 (1000€)

	2015	**2016**	**2017**	**2018**
Account receivables	970,140	1,040,000	1,170,000	1,270,000
Revenues	5,834,691	6,351,889	6,584,748	7,060,342
Account receivables turnover (days)	**6.01**	**6.11**	**5.63**	**5.56**

Chart. 4.6 Account receivable turnover of Hella (2015-2018)

Generally speaking, the larger the account receivables turnover is, the better is it.

We can find that the account receivable grows stably in these years. But the account receivables turnover decrease in these years.

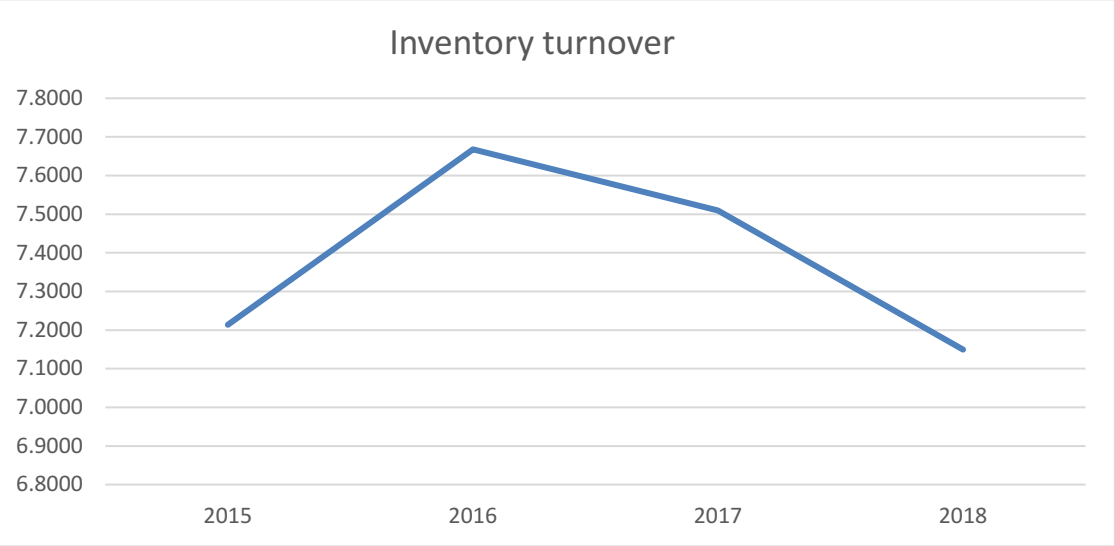
The main reason of it is because the speed of account receivables grows slower than the speed of the revenues.

And now, it's time for analysis the inventory turnover of Hella. Here is the Tab. 4.10 and Chart. 4.7 which shows the data of inventory turnover of Hella from 2015 to 2018.

Tab. 4.10 Inventory turnover of Hella from 2015 to 2018 (1000€)

	2015	**2016**	**2017**	**2018**
Average inventory	593,388	608,219	635,559	712,511
Costs of goods sold	4,280,770	4,663,691	4,772,735	5,094,043
Inventory turnover (days)	**7.2141**	**7.6678**	**7.5095**	**7.1494**

Chart. 4.7 Inventory turnover of Hella (2015-2018)



Inventory turnover is a ratio showing how many times a company has sold its inventory during a given period (in our analysis, its 1 year). The shorter the inventory turnover, the better the company.

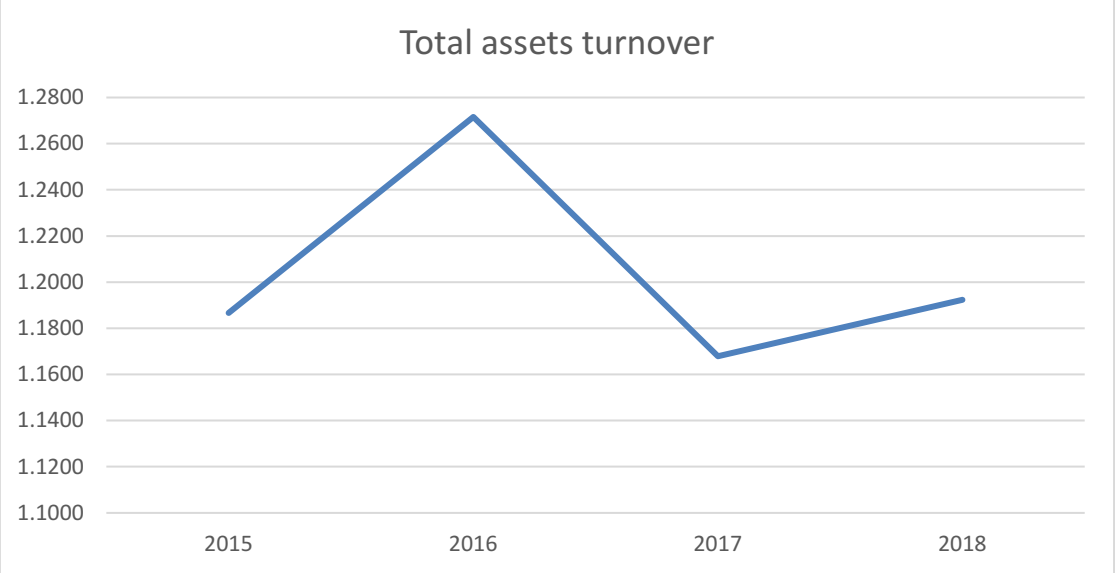
In our Tab. 4.10. We can find the average inventory increased gradually in these 4 years, from 593,388 to 712,511. The costs of goods sales also increased gradually into these 4 years, from 4,280,700 to 5,094,043. But because the different amplitude it increased. The inventory turnover reached 7.6678 in 2016, which is the highest. And decreased in next 2 years.

Finally, we are going to analysis the total assets turnover of Hella from 2015 to 2018. Here is the Tab. 4.11 and Chart. 4.8 on the below:

Tab. 4.11 Total assets turnover of Hella from 2015 to 2018 (1000€)

	2015	2016	2017	2018
Revenues	5,834,691	6,351,889	6,584,748	7,060,342
Total assets	4,916,947	4,995,301	5,638,197	5,921,224
Total assets turnover	**1.1866**	**1.2716**	**1.1679**	**1.1924**

Chart. 4.8 Total assets turnover of Hella (2015-2018)



Total assets turnover is a ratio to measure how successfully a company is using its assets to generate its revenue. The higher the asset turnover ratio is, the more efficient a company is.

From the Tab. 4.11 showed on the upside, we can find the total assets turnover raised from 1.1866 to 1.2716 in 2015 – 2016. And it decreased in 2017, raised again in 2018.

But the revenues is rapidly increased. And total assets is the same. The main reason of the change between total assets turnover of each years must because in 2016, the total assets haven't grown much, but it happened in 2017.

4.4 Solvency ratio analysis of Hella

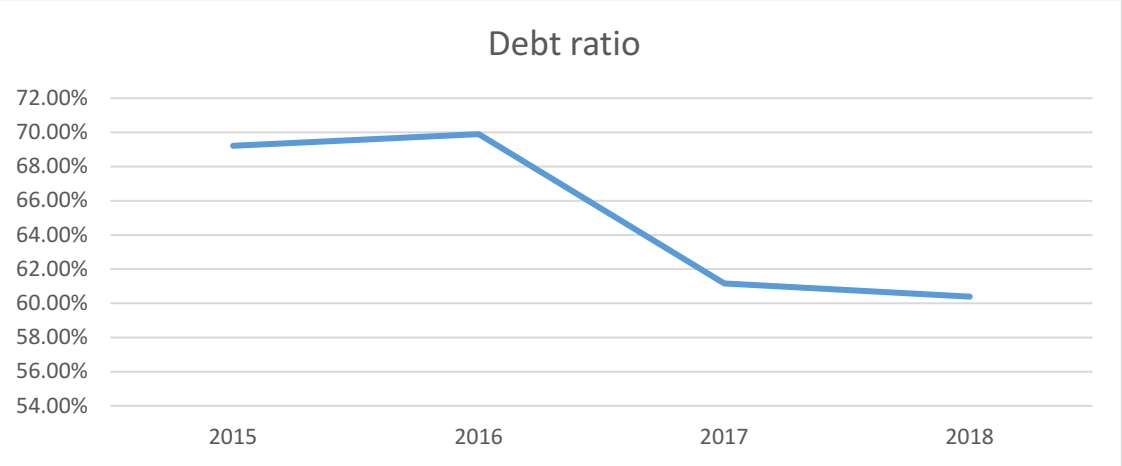
The solvency ratio is the ratio that determines the security of a company's liabilities and the ability to repay short-term liabilities. The size of solvency reflects to a large extent the level of risk of business operations. In the solvency ratio analysis of Hella. We are going to analysis the debt ratio, debt to equity ratio and interest coverage ratio of Hella.

At first, we are going to analysis the debt ratio of Hella. And the data shows on the Tab. 4.12 and Chart. 4.9 on the below:

Tab. 4.12 Debt ratio of Hella from 2015 to 2018 (1000€)

	2015	**2016**	**2017**	**2018**
Total liabilities	3,007,253	3,016,651	3,412,453	3,442,959
Total assets	4,916,947	4,995,301	5,638,197	5,921,224
Debt ratio	**69.22%**	**69.90%**	**61.16%**	**60.39%**

Chart. 4.9 Debt ratio of Hella (2015-2018)



The greater of debt ratio, which means that more of the assets of a company comes from debt, the less healthy of the company is.

In the data we showed on the upside. We can find total liabilities of Hella increased a lot in the year 2017 and 2018 from 3,412,453 to 3,442,959 and total assets have sharply

increase in 2017 and 2018 either from 5,638,197 to 5,921,224. The debt ratio of Hella decreased a lot in 2017 and 2018.

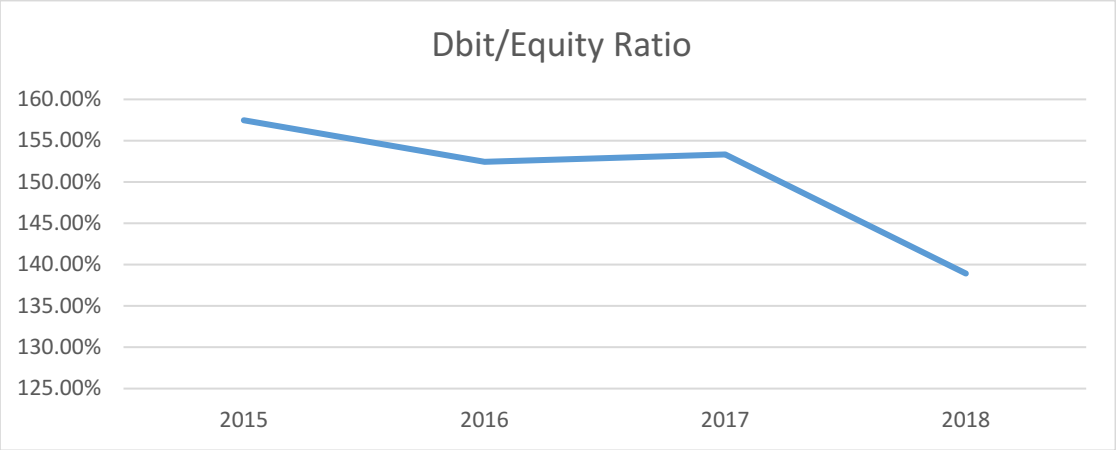
From the data we showed on the upside, we can find the capital structure is much healthier for Hella in 2017 and 2018.

Then we are going to analysis the debt to equity ratio of Hella. The data is showing on the Tab. 4.13 and Chat. 4.10 on the below:

Tab. 4.13 Debt to equity ratio of Hella from 2015 to 2018 (1000€)

	2015	**2016**	**2017**	**2018**
Total liabilities	3,007,253	3,016,651	3,412,453	3,442,959
Equity	1,909,694	1,978,650	2,225,744	2,478,265
Debt/equity ratio	**157.47%**	**152.46%**	**153.32%**	**138.93%**

Chart. 4.10 Debt to equity ratio of Hella (2015-2018)



The higher the ratio is, the higher the company's ability to repay the long-term debt of itself. It basically used for measuring the stability of the company's financial situation.

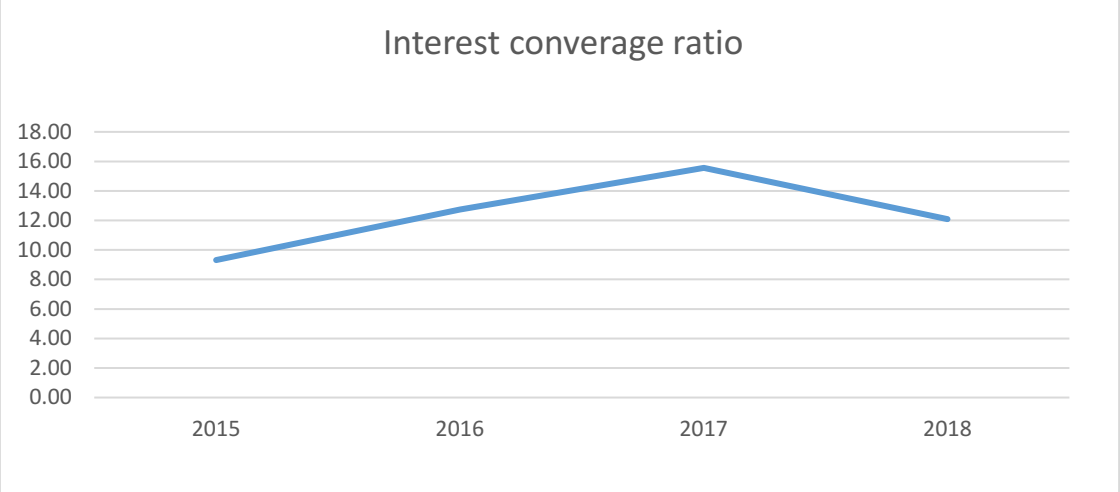
In the data we showed on the upside. We can find the total liability increase a lot from 3,412,453 to 3,442,959 in 2017 and 2018, and equity is the same as the total liability. The debt to equity ratio is almost the same in the first 3 years. But in year 2018, It changed a lot to 138.93% . The most obvious reason of the financial situation changed in 2018 is because the equity changed a lot compared to another 3 years.

And finally we will introduce the data of interest coverage ratio in the Tab. 4.14 and Chart. 4.11 on the below:

Tab. 4.14 Interest coverage ratio of Hella from 2015 to 2018 (1000€)

	2015	**2016**	**2017**	**2018**
EBIT	429,503	419,792	507,170	574,287
Interest expenses	46,109	32,978	32,593	47,495
Interest coverage ratio	**9.31**	**12.73**	**15.56**	**12.09**

Chart. 4.11 Interest coverage ratio of Hella (2015-2018)



The interest coverage ratio is used to determine how easily a company can pay interest on its outstanding debt. The greater it is. The greater of the company to pay for the intertest.

From the data showed on the upside, we can find that in 2015 and 2018 the interest expenses is higher than2016 and 2017, but the EBIT of 2017 and 2018 is higher than 2015 and 2016. Reflected on the interest coverage ratio, we can find that the year 2017 (15.56) is higher than another 2 years. The reason of it is because the EBIT of it is higher and the interest expenses is lower than other years.

4.5 Profitability ratio analysis of Hella

Profitability ratio refers to the ability of companies to earn profits in daily operation, it is the basis of the survival and development of enterprises, which is a very concerned index in all aspects. It used to analysis a business's ability to generate earnings relative to its associated expenses.

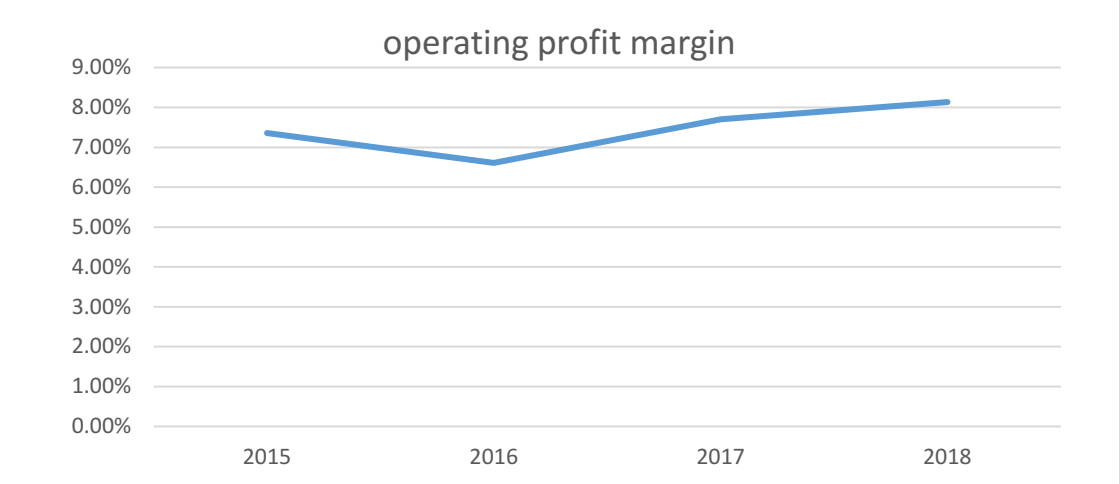
In this part we are going to using 5 different ratios to analysis the profitability of Hella.

At first, we are going to analysis the operating profit margin to Hella. The data is showed on the Tab. 4.15 and Chart. 4.12 on the below:

Tab. 4.15 Operating profit margin of Hella from 2015 to 2018 (1000€)

	2015	**2016**	**2017**	**2018**
EBIT	429,503	419,792	507,170	574,287
Revenues	5,834,691	6,351,889	6,584,748	7,060,342
Operating Profit Margin	**7.36%**	**6.61%**	**7.70%**	**8.13%**

Chart. 4.11 Operating profit margin of Hella (2015-2018)



Operating Profit Margin is a profitability ratio used to calculate the percentage of profit a company produces from its operations before minus the taxes and interest. The higher is it, the greater it is.

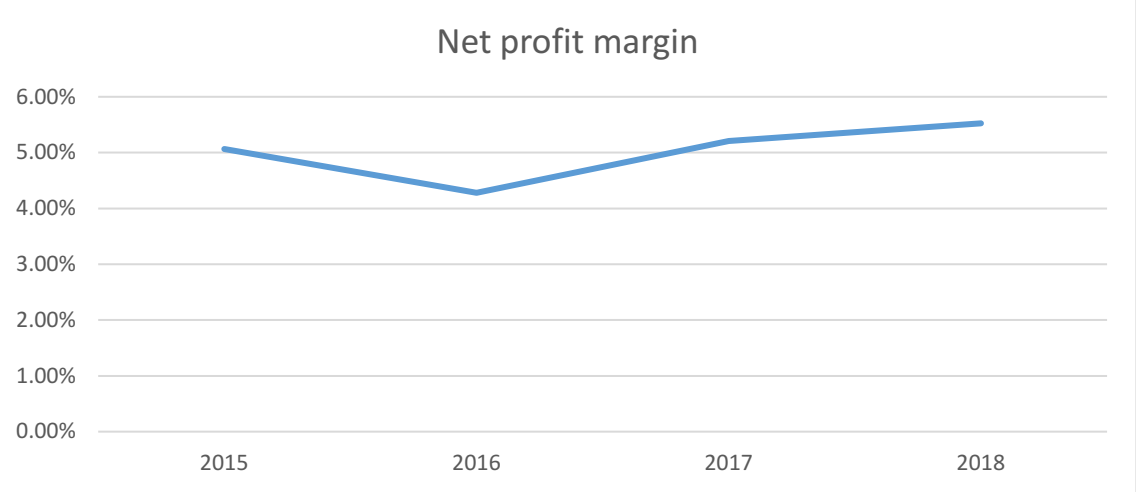
From the data we showed on the upside, we can find the EBIT of each is increasing, mostly in the 2018 from 507,170 to 574,287. And for revenues, the growth of 2015-2016 and 2017-2018 is obvious larger than others. The biggest operating profit margin (8.13%) in these years is 2018, and the smallest is the year 2016. We can imagine why 2016 is the smallest is because Hella expands aftermarket e-commerce activities in this year and it makes a lot of operating expenses in a considerable cycle.

Then we are going to analysis the net profit margin of Hella. The data is showing on the Tab. 4.16 and Chat. 4.12 on the below:

Tab. 4.16 Net profit margin of Hella from 2015 to 2018 (1000€)

	2015	**2016**	**2017**	**2018**
Revenues	5,834,691	6,351,889	6,584,748	7,060,342
EAT	295,453	271,861	343,107	390,051
Net profit margin	**5.06%**	**4.28%**	**5.21%**	**5.52%**

Chart. 4.12 Net profit margin of Hella (2015-2018)



The net profit margin is equal to how much net income or profit is generated as a percentage of revenue. The higher is it, The better it is.

From the data we calculated on the upside, we can find the revenues is likely growing stable, but it still have a great change from 5,834,691 to 6,351,889 and from 6,584,748 to 7,060,342 in year 2016 and 2018. The EAT in 2016 seems to be wired (271,861)

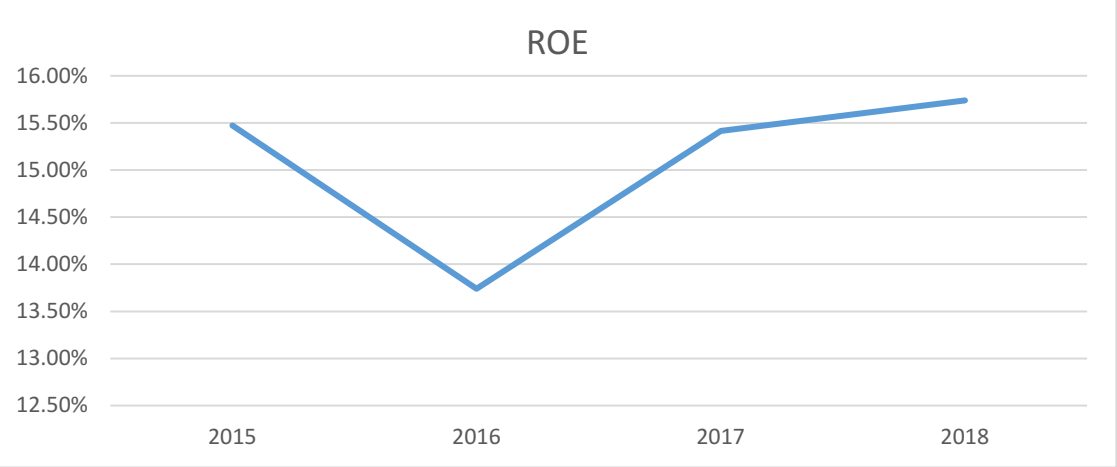
compared to other years, because although it has a large revenues, it hasn't grown as another years, it mostly because the income tax and financial costs increased in this year. And the net profit margin of 2016 and 2018 is different than other 2 years either.

And now we are going to analysis the Return on equity of Hella, Here is the data showed on the below:

Tab. 4.17 Return on equity of Hella from 2015 to 2018 (1000€)

	2015	**2016**	**2017**	**2018**
EAT	295,453	271,861	343,107	390,051
Equity	1,909,694	1,978,650	2,225,744	2,478,265
Return on equity	**15.47%**	**13.74%**	**15.42%**	**15.74%**

Chart. 4.13 Return on equity of Hella (2015-2018)



Return on equity measures financial performance calculated by dividing net income by shareholders' equity. A higher return on assets means a better company to invest.

From the data we showed on the upside, we can find the EAT of 2016 decreased to 271,861 compared to 2015, and in 2017, it increased a lot (343,107). It also has a further increase in 2018. The equity increase in all 4 years, But in the year 2017, it grows to 2,225,744, the most in these years. And the return on equity of Hella on 2016 is the smallest in the 4 years.

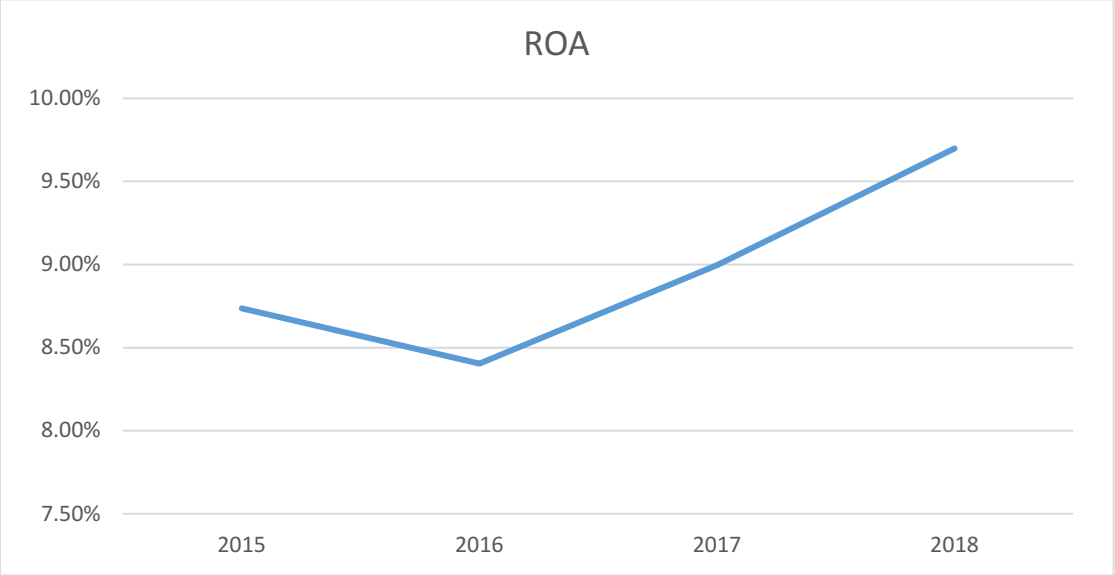
We can find the reason of the change happened in Hella's EAT and return on equity because in 2017 and 2018 Hella made a lot of change in its production area. And in year 2016 Hella use more money in its aftermarket segment to increase its goodwill. It became a base of Hella's great progress in last 2 years.

Then it is the return on assets of Hella which data showed on the Tab. 4.18 and Chart. 4.14 on the below:

Tab. 4.18 Return on assets of Hella from 2015 to 2018 (1000€)

	2015	**2016**	**2017**	**2018**
EBIT	429,503	419,792	507,170	574,287
Assets	4,916,947	4,995,301	5,638,197	5,921,224
Return on assets	**8.74%**	**8.40%**	**9.00%**	**9.70%**

Chart. 4.14 Return on assets of Hella (2015-2018)



Return on assets (ROA) is an indicator of how much net profit is generated per unit of asset Assets. And the higher the return on asset is, the better the effect on a company's assets.

In the Tab. 4.18, the EBIT of 2017 and 2018 increase from 507170 to 574287. And meantime the assets of it increase a lot compared to 2015 and 2016 either. It shows on

the Return on assets that 2016 is the smallest, which is 8.40%, and it increase rapidly from 2017 to 2018. The capital investment on 2016 and the progress Hella made in 2017 and 2018 finally pay off. Which reflected on its return on assets.

4.6 Dupont analysis of Hella

In this part, we will use DuPont analysis to analysis the financial data of Hella. DuPont Analysis is an analytical method invented by DuPont in the United States to analyze the financial position of a company in an integrated manner using the relationship between several major financial ratios. In this part, we will decompose ROE into 3 parts: Net profit margin, total assets turnover and financial leverage. And then, we will divide the net profit margin into tax burden, interest burden and operating profit burden.

We are going to introduce the basic of all the components we had talked about in the Tab. 4.19 on the below:

Tab. 4.19 The values of all components of Hella (2013-2017)

	2014	**2015**	**2016**	**2017**	**2018**
Net profit margin	0.0430	0.0506	0.0428	0.0521	0.0552
Tax burden	0.7436	0.7506	0.7139	0.7412	0.7357
Interest burden	0.8910	0.9165	0.9072	0.9128	0.9231
Operating profit burden	0.0649	0.0736	0.0661	0.0770	0.0813
Total assets turnover	1.1984	1.1866	1.2716	1.1679	1.1924
Financial leverage	3.3222	2.5747	2.5246	2.5332	2.3893
Return on equity	**0.1711**	**0.1547**	**0.1374**	**0.1542**	**0.1574**

From the Tab. 4.19 showed on the upside, we can calculate the absolute change of each components.

Here is the Tab. 4.20 which showed the absolute change of each burden on the below:

Tab. 4.20 The absolute change of each components of Hella

	2014/2015	2015/2016	2016/2017	2017/2018
Net profit margin	0.0077	-0.0078	0.0093	0.0031
Tax burden	0.0070	-0.0367	0.0273	-0.0054
Interest burden	0.0254	-0.0093	0.0056	0.0104
Operating profit burden	0.0088	-0.0075	0.0109	0.0043
Total assets turnover	-0.0118	0.0849	-0.1037	0.0245
Financial leverage	-0.7474	-0.0501	0.0086	-0.1439
Return on equity	**-0.0164**	**-0.0173**	**0.0168**	**0.0032**

From the Tab. 4.20, we can find the net profit margin decrease in 2015 to 2016, from 0.0077 to -0.0078. The tax burden decrease in 2015 to 2016 from -0.0367, but we can also find it decrease in the 2017 to 2018. The interest burden decrease in the 2015 to 2016 from 0.0254 to -0.0093. And it still hasn't change in the operating profit margin. Total assets turnover decrease in 2014 to 2015 and 2016 to 2017. The financial leverage only increase in 2016 to 2017 . For ROE the year 2014 to 2015 and 2015 to 2016 decreased.

If we want to find out which components influences return on assets most. We must use influence quantification to figure it out. For that, we are going to choose the method of gradual change in this part.

Tab. 4.21 The result of gradual change method (2014-2015)

	2014 (a_0)	**2015** (a_1)	**2014/2015** (Δa)	Δx_{a_i}	**Order**
Net profit margin (a_1)	0.0430	0.0506	0.0077	0.0306	1
Total assets turnover(a_2)	1.1984	1.1866	-0.0118	-0.0019	2
Financial leverage(a_3)	3.3222	2.5747	-0.7474	-0.0448	3
Sum				**-0.0161**	

$$\Delta x_{a_1} = 0.0077 \cdot 1.1984 \cdot 3.3222 = 0.0306$$

$$\Delta x_{a_2} = 0.0506 \cdot -0.0118 \cdot 3.3222 = -0.0019$$

$$\Delta x_{a_3} = 0.0506 \cdot 1.1866 \cdot -0.7474 = -0.0448$$

If we consider the change happens in rounded, we can find the sum of gradual changes is basically equal to the absolute change of ROE (-0.0164) from 2014 to 2015.

Tab. 4.22 The result of gradual change method (2015-2016)

	2015 (a_0)	**2016** (a_1)	**2015/2016** (Δa)	Δx_{a_i}	**Order**
Net profit margin (a_1)	0.0506	0.0428	-0.0078	-0.0238	1
Total assets turnover (a_2)	1.1866	1.2716	0.0849	0.0093	2
Financial leverage (a_3)	2.5747	2.5246	-0.0501	-0.0027	3
Sum				**-0.0172**	

$$\Delta x_{a_1} = -0.0078 \cdot 1.1866 \cdot 2.5747 = -0.0238$$

$$\Delta x_{a_2} = 0.0428 \cdot 0.0849 \cdot 2.5747 = 0.0093$$

$$\Delta x_{a_3} = 0.0428 \cdot 1.2716 \cdot -0.0501 = -0.0027$$

If we consider the change happens in rounded, we can find the sum of gradual changes is basically equal to the absolute change of ROE (-0.0173) from 2015 to 2016.

Tab. 4.23 The result of gradual change method (2016-2017)

	2,016 (a_0)	**2,017** (a_1)	**2016/2017** (Δa)	Δx_{a_i}	**Order**
Net profit margin (a_1)	0.0428	0.0521	0.0093	0.0298	1
Total assets turnover (a_2)	1.2716	1.1679	-0.1037	-0.0136	2
Financial leverage (a_3)	2.5246	2.5332	0.0086	0.0005	3
Sum				**0.0167**	

$$\Delta x_{a_1} = 0.0093 \cdot 1.2716 \cdot 2.5246 = 0.0298$$

$$\Delta x_{a_2} = 0.0521 \cdot -0.1037 \cdot 2.5246 = -0.0136$$

$$\Delta x_{a_3} = 0.0521 \cdot 1.1679 \cdot 0.0086 = 0.0005$$

If we consider the change happens in rounded, we can find the sum of gradual changes is basically equal to the absolute change of ROE (0.0168) from 2016 to 2017.

Tab. 4.24 The result of gradual change method (2017-2018)

	2017 (a_0)	**2018** (a_1)	**2017/2018** (Δa)	Δx_{a_i}	**Order**
Net profit margin (a_1)	0.0521	0.0552	0.0031	0.0091	1
Total assets turnover (a_2)	1.1679	1.1924	0.0245	0.0034	2
Financial leverage (a_3)	2.5332	2.3893	-0.1439	-0.0094	3
Sum				**0.0031**	

$$\Delta x_{a_1} = 0.0031 \cdot 1.1679 \cdot 2.5332 = 0.0091$$

$$\Delta x_{a_2} = 0.0552 \cdot 0.0245 \cdot 2.5332 = 0.0034$$

$$\Delta x_{a_3} = 0.0552 \cdot 1.1924 \cdot -0.1439 = -0.0094$$

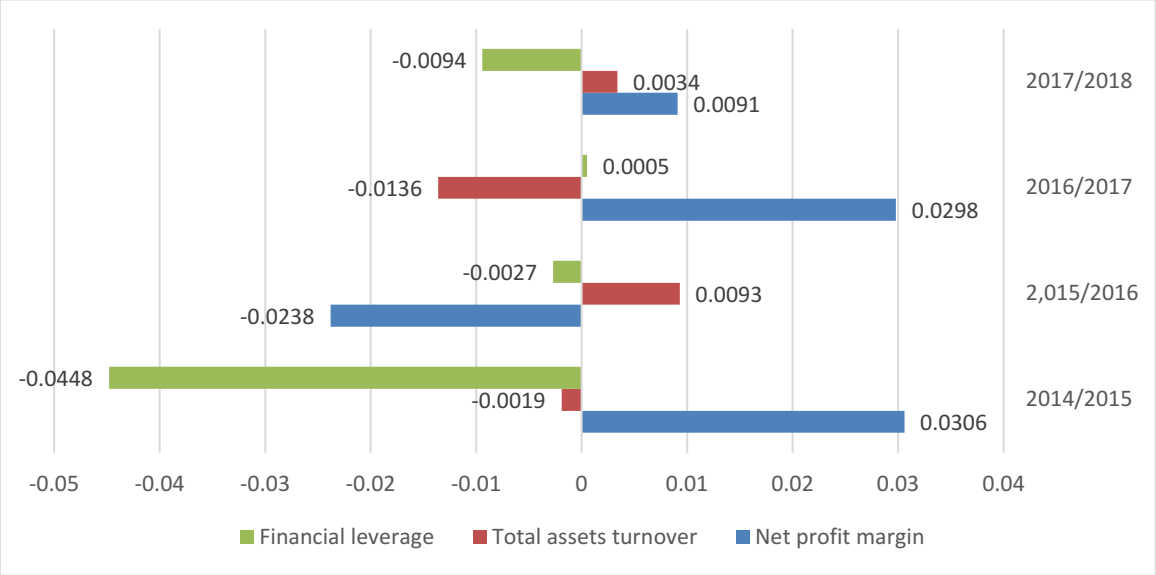
If we consider the change happens in rounded, we can find the sum of gradual changes is basically equal to the absolute change of ROE (0.0032) from2017 to 2018.

From the analyzing the gradual change of each years from 2015-2018, we can use our previous result and put it together to analysis the difference between each year from the changes. And we will use the Tab. 4.25 and Chart. 4.15 to show that from below:

Tab. 4.25 Gradual changes of ROE (2015-2018)

Δx_{a_i}	**2014/2015**	**2,015/2016**	**2016/2017**	**2017/2018**
Net profit margin (a_1)	0.0306	-0.0238	0.0298	0.0091
Total assets turnover (a_2)	-0.0019	0.0093	-0.0136	0.0034
Financial leverage (a_3)	-0.0448	-0.0027	0.0005	-0.0094
Sum	**-0.0161**	**-0.0172**	**0.0167**	**0.0031**

Chart. 4.15 Gradual changes of ROE (2015-2018)



From the Tab.4.25 showed on the upside. We can find that the net profit margin decreased in 2015/2016, from 0.0306 to -0.0238. The total assets turnover increased in 2015/2016 and 2017/2018. The financial leverage decreased in first two years, which is -0.0448 and -0.0027, and in the final year, its decreased again to -0.0094. The changes of each component ratios to ROE is positive.

From the Chart. 4.15 showed on the upside. We can find the component ratio which influence the ROE most is the net profit margin. And the one changes the most severe is the total assets turnover, which also has a great effect on the ROE.

And now, we can make a more meticulous analysis of each gradual changes for each years.

From the year 2014/2015, the total assets turnover decreased 0.0019, and the financial leverage also decreased 0.0448. It's the main reason which cause the decrease of ROE. And from Tab. 4.21, we can find the ratio influence ROE most in 2014/2015 is the financial leverage.

From year 2015/2016, the net profit margin decreased 0.0238. Different than the last year, the total assets turnover increased 0.0093. And financial leverage is still decreased, but smaller than last year. Net profit margin is the ratio influence ROE most in this year. Grow of financial leverage cause a more positive affect for its ROE.

From 2016/2017, we can simply find the net profit margin is positive in this year.

Total assets turnover turn negative again to -0.0136 . The financial leverage became positive first time in 3 years. In this year, the ratio reflected ROE most is the net profit margin.

In 20917/2018, net profit margin is positive again (0.0091), the total assets turnover and financial leverage became opposite than the previous year. The ratio reflect ROE most is the financial leverage(-0.0094).

4.7 Summary

In our structure, we divided it into 3 parts. In the first part, we are using cash conversion cycle and cash conversion period to analysis the operating cycle of Hella. Then, we are using financial ratio analysis to analysis the financial position of Hella. And finally, we have used the Dupont analysis to analysis the financial data of Hella. The main contents in this chapter is to use financial ratio analysis to analysis the real financial data of Hella.

From the operating cycle analysis. We can find the cash conversion cycle increased to 21.21 in 2016 and returned to 20.29 in 2017. In 2018, it became a relatively low period of 29.45. The Cash conversion period changes as same as cash conversion cycle, first it increase to a higher stage (14.45), and then it returned back and became lower (12.74) than before.

In financial ratio analysis, we will sum it in different individual parts.

First part it is the Liquidity ratio of Hella. it shows the current ratio in 2017 , it has reached a very low level. the quick ratio of Hella decreased a lot in 2017.And it has gone up in 2018. The cash ratio of Hella decrease in these 4 years, from 0.45 to 0.42 and in 2017 there is a small improve to 0.44.

And then it is the activity ratio of Hella. The average collection period of Hella is also growing stable from 59.86 to 64.76. It because the speed of account receivables grows slower than the speed of the revenues. the ART decrease slowly in these years. The inventory turnover reached 7.6678 in 2016, which is the highest. And decreased in next 2 years. we can find the total assets turnover raised from 1.1866 to 1.2716 in 2015 to 2016. And decreased in 2017, raised back in 2018.

Now we are going to analysis the solvency ratio of Hella. In the data we showed on the upside. We can find the debt ratio of Hella decreased a lot in 2017 (60.52%) and 2018 (58.15%). The debt to equity ratio is almost the same in the first 3 years. But in year 2018, It changed a lot to 138.93%. And the ICR of the year 2017 is higher than another 2 years.

Finally, we are going to analysis the profitability ratio of Hella, From the data. The biggest operating profit margin in these years is 2018, and the smallest is the year 2016. And the 2016 is the smallest. the net profit margin of 2016 and 2018 is different than

other 2 years, it is lower in 2016(0.0428) and in 2018 its much higher (0.0552). The return on equity of Hella on 2016 is the smallest in the 4 years. the Return on assets that 2016 is the smallest, which is 8.40%, and it increase rapidly from 2017 to 2018.

For the third part, Dupont analysis of Hella, we can find We can find that the net profit margin decreased in 2015 to 2016, from 0.0306 to -0.0238. The total assets turnover increased in 2015 to 20165 and 2017 to 2018. The financial leverage decreased in first two years, which is -0.0448 and -0.0027, and in the final year, its decreased again to -0.0094. The changes of each component ratios to ROE is determined by is it positive or negative. And the most severe is the total assets turnover.

In our analysis of the financial ratio. We can find Hella has made a great effort in these years. It still have some unsolved problems Like measure the relationships between supply and its demand, developing its company liquidity and make a higher effort on its shareholder's return. And also even Hella occupies one of a dominant position in the automobile lighting industry, which is a leader in the Lighting, Electronics and Aftermarket markets. It also have some great competitors like Automotive Lighting, and the grow of the automotive lighting industries in emerging developing countries also affect its market a lot. In order to face its problems. There are some tips I can provide for it. First, because of the relatively advanced technology and more experienced in research. Hella has obvious advantages in competing with those lighting industries in emerging developing countries. And Hella still need to increase the funds in advertisement in those newly developing countries like China and India. It will increase the speed Hella transform its inventory to cash. But above all, it is vital to develop better products and stand at the forefront of similar technologies.

5 Conclusion

Financial analysis is an analysis for a company for whether a company is stable, solvent, liquid or profitable enough to warrant a monetary investment which involves using financial data to analysis an enterprise's performance and make recommendations about how it can improve in the future. Because of the rapid changes in financial markets. Financial analysis have become more and more important in these days because it's a successful way to evaluate the status of company's ability to manage itself operations. It can also become a very efficient way to surviving and developing in financial market. It is necessary for a company to promote a better development by using financial results.

The goal of the paper is to provide certain information for the managers and investors by analyses the financial statements of Hella through financial ratio analysis and DuPont analysis.

From our analysis on the upside. For the first chapter, we have introduced our purpose and our introduction of the whole structure of this paper.

In chapter 2, we have descripted the financial analysis methodology, and provide instruction for our actual operation of the financial analysis. We still have simply describe the basic financial statements and introduce the common size analysis and financial ratio analysis. After that, Dupont analysis is still have been introduced.

In our chapter 3, we have analyzed the basic financial data of financial statements of Hella. And we found the change of any financial situations in the balance sheet and income statement connected it with the real financial position, we still use common size analysis to analysis it in this chapter. We can find that the company develop healthily. It keeps a good situation in its financial structure. Hella get a very good progress in the production of some new modular lighting series and other companies such as Audi Sport TT Cup. And Hella get a very good progress in decreasing the liabilities and create a very large change in shareholder's equity in the production of some new modular lighting series in these years. And It shows to us that although there is decreasing of grow proportion, Hella changed its business method and become better when it faces with some type of failure.

In chapter 4. We have analyzed the financial ratios and Dupont analysis by the methodologies mentioned in chapter 2 by the data obtained from the annual report of

Hella from year 2015 to year 2018. And we have used the real financial characteristic of Hella, and combined it will the changes to financial ratio of it. From the analysis in the upper contents. We can find the cash conversion cycle is decreasing in these through Hella discovered its mistakes in 2016. The debt ratio and debt to equity ratio is decreasing in these years, which shows that Hella has a healthier financial structure than before. And the decrease of liquidity ratio in these years also shows to us that because of many building have been built for Hella in these years, the liquidity of Hella is not as good as it than before, But it is still very good. The ROE in 2016 decrease a lot, but it increase a lot in the last 2 years. The ROA in 2016 is still decrease a lot. It shows Hella has made many efforts in expanding its e-commerce activities in the aftermarket segment. And from the Dupont analysis and influence quantification in the chapter 4. We can find the net profit margin affects its ROE a lot.

In our analysis. We can find Hella has made a great effort in these years. It expand international production place, expands aftermarket e-commerce activities and building new Center for Automotive Lighting Technology. It still have some unsolved problems for Hella. Like measure the relationships between supply and its demand, developing its company liquidity and make a higher effort on it's shareholder's return. But generally speaking, Hella got an undoubtable effort in the recent few years.

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List of Abbreviations

ACP	Average collection period
ART	Account receivables turnover
CCP	Cash conversion period
CCP	Cash conversion period
CCC	Cash conversion cycle
DSO	Days sales outstanding
DPO	Days payable outstanding
DIO	Days of inventory outstanding
EAT	Earning after tax
EBIT	Earning before interest and tax
EBT	Earning before taxes
ICP	Inventory conversion period
IT	Inventory turnover
NPM	Net profit margin
OPM	Operating profit margin
RCP	Receivables conversion period
Rev	Revenues
ROE	Return on equity
ROA	Return on assets
ROS	Return on sales
TAT	Total assets turnover

Declaration of Utilization of Results from the Bachelor Thesis

Declaration of Utilization of Results from the Bachelor Thesis

Herewith I declare that

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Ostrava dated 29.04.2019

Xiaohan Wang

Student's name and surname

List of Annexes

Annexes

Annex 1: Income statement of Hella from 2014 to 2018. (1000 €)

	2015	2016	2017	2018
Sales	**5,834,691**	**6,351,889**	**6,584,748**	**7,060,342**
Cost of sales	-4,280,770	-4,663,691	-4,772,735	-5,094,043
Gross profit	**1,553,921**	**1,688,198**	**1,812,014**	**1,966,299**
Research and development costs	– 543,931	– 623,459	-636,243	-692,033
Distribution costs	– 455,459	– 493,913	-506,319	-522,912
Administrative costs	– 196,869	– 218,239	-229,627	-241,585
Other income and costs	16,298	13,918	14,965	20,512
Earnings from investments	55,336	52,979	51,937	43,910
Other income from investments	207	308	443	97
EBIT	**429,503**	**419,792**	**507,170**	**574,287**
Financial income	38,453	32,515	15,027	29,614
Financial costs	-74,331	-72,027	-59,274	-73,751
Net financial result	**-35,878**	**-39,512**	**-44,247**	**-44,137**
EBT	**393,625**	**380,820**	**462,923**	**530,149**
Income tax	-98,172	-108,419	-119,816	-140,099
EAT	**295,453**	**271,861**	**343,107**	**390,051**
Of which attributable				
To the owners of the company	286,995	268,500	341,733	388,679
To the minority interest	8,458	3,361	1,374	1,372

Annex 2: Balance sheet of Hella from 2015 to 2018. (1000 €)

	2015	2016	2017	2018
Cash and cash equivalent	602,744	585,134	783,875	688,187
Financial assets	405,077	328,790	314,386	332,934
Trade receivables	839,322	937,471	1,067,979	1,166,571
Other receivables and non-financial assets	152,010	146,376	155,738	148,972
Inventories	608,853	607,584	663,533	761,488
Current tax assets	24,504	26,783	25,657	25,800
Non-current assets held for sale	3,357	2,924	-	2,030
Current assets	**2,635,867**	**2,635,062**	**3,011,167**	**3,125,981**
Intangible assets	220,861	225,021	254,850	311,481
Tangible assets	1,612,331	1,697,539	1,906,676	1,994,276
Financial assets	19,653	17,033	30,094	37,212
Equity accounted investment	266,768	261,448	273,901	292,008
Deferred tax assets	118,562	122,954	117,488	110,748
Other non-current assets	42,905	36,244	44,021	49,518
Non-current assets	**2,281,080**	**2,360,239**	**2,627,030**	**2,795,243**
Assets	**4,916,947**	**4,995,301**	**5,638,197**	**5,921,224**
Financial liabilities	100,221	86,880	340,481	41,990
Trade payables	573,893	633,818	672,888	711,775
Current tax liabilities	45,776	57,923	60,670	70,194
Other liabilities	556,934	558,043	635,935	714,334
Provisions	72,644	65,259	132,689	100,481
Current liabilities	**1,349,448**	**1,401,923**	**1,670,982**	**1,810,454**
Financial liabilities	1,038,886	1,064,789	1,036,205	1,165,910
Deferred tax liabilities	24,882	25,767	32,371	39,978

Other liabilities	236,371	193,284	182,320	223,422
Provisions	357,646	330,888	351,103	342,668
Non-current liabilities	**1,657,785**	**1,614,728**	**1,601,999**	**1,771,977**
Subscribed capital	222,222	222,222	222,222	222,222
Reserves and unappropriated surplus	1,658,016	1,750,563	1,998,533	2,252,155
Equity before non-controlling interests	**1,880,238**	**1,972,785**	**2,220,755**	**2,474,377**
Non-controlling interests	29,456	5,865	4,989	3,888
Equity	**1,909,694**	**1,978,650**	**2,225,744**	**2,478,265**
Equity and liabilities	**4,916,947**	**4,995,301**	**5,638,197**	**5,921,224**